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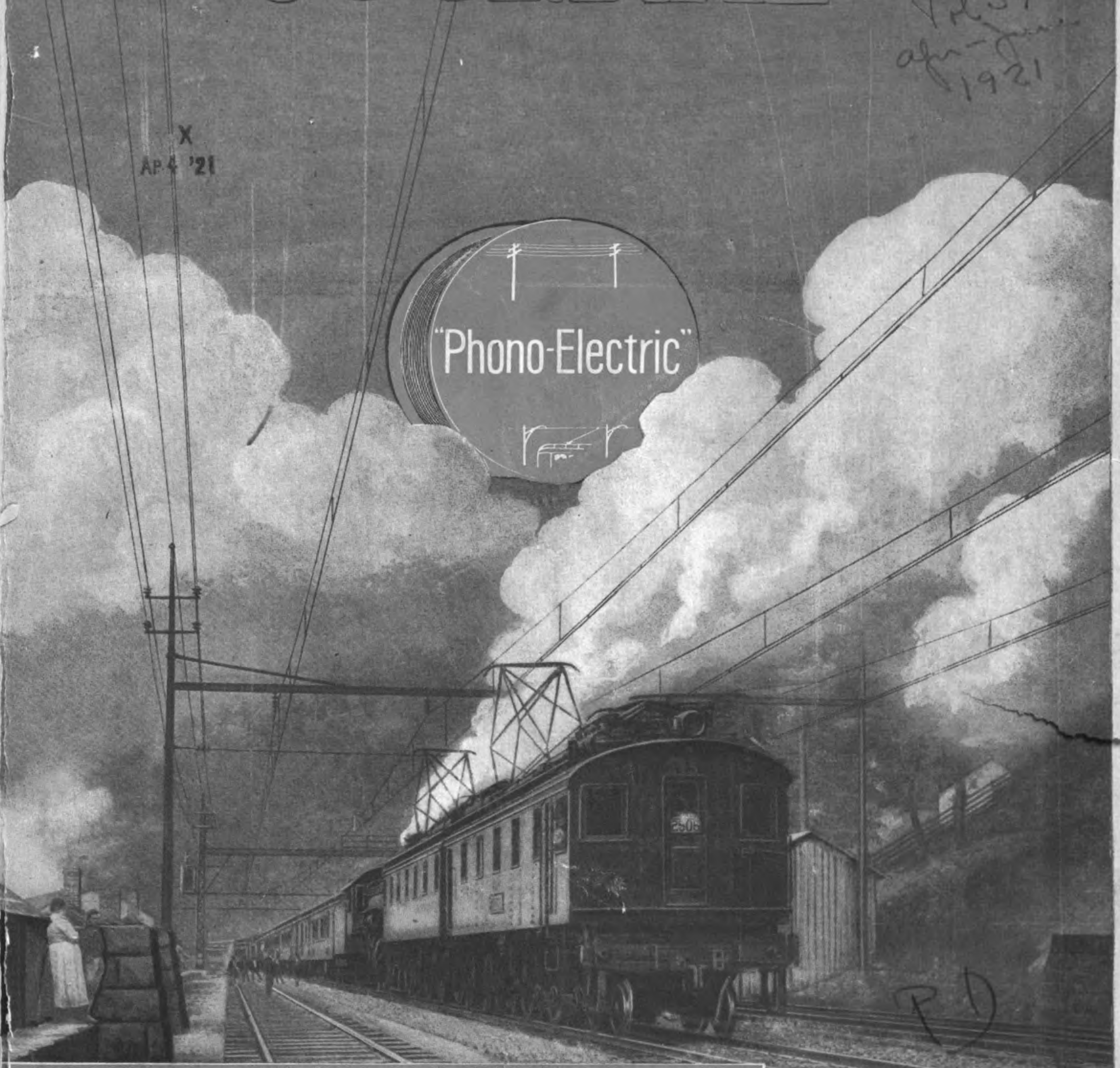

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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How Far Does It Pay to Cut Expenses?

ON MANY an electric railway property it has been necessary to reduce expenses almost regardless of the results, and even to refrain from making expenditures which would have earned the interest rate several times over. Such procedure has "gone against the grain" with the thrifty manager who realizes that he or his successor must pay for this enforced parsimoniousness in the long run. Of what use is it to offer a man a 25 per cent investment if he has no money or credit? Many a railway has seemed to be in this position during the past few years.

Nevertheless, there is a limit to which expenses can be cut if a road is to be kept operating at all. If track and equipment are allowed to run down, sooner or later the earning capacity of the property is impaired. Either the railway physically will not be able to carry passengers or people will not want to ride on account of the shabbiness of the cars and the discomfort of travel. Therefore, before any more requests for maintenance or more service are turned down such questions as these demand answer: Have all possible economies in maintenance and in conducting transportation been located? Does the public which is holding down the fare fully understand the situation? Have all available means for securing new business been considered? Will the proposed curtailment seriously impair the service now and later? Have the best brains on the property and within reach elsewhere been exercised to the limit in trying to answer such questions as these?

The making of drastic cuts may be the only thing to do in some cases, but there is talent enough in the industry, financial, managerial and technical, to render the cuts less necessary if this talent is utilized 100 per cent. And this does not imply disparagement of the splendid results that have been and are now being achieved.

Route Vehicular Traffic to Avoid Main Intersections

IN MANY smaller cities the intersection of the main north-south and east-west thoroughfares is at the center of the business district. These two streets are usually occupied by the main street car lines and they also serve as the principal lanes of automobile and other vehicular traffic, thus focusing nearly all of the city's traffic at one point of intersection. This results in a bad congestion which should be corrected to the advantage of every one. It can be done simply and readily in almost every case with the co-operation of the police department if all through vehicular traffic is detoured one block to the right at the first corner before reaching this main intersection. This would clear the main intersection of practically all but the street car traffic which cannot be readily rerouted, would speed up materially the street car service through this intersection, would make the crossings much safer for pedestrians, and would very greatly help the rapid movement of automobiles through the downtown section.

The scheme would mean a two-block square in the center of the city, inside of which there would be only street car and pedestrian traffic, and around which automobile traffic would travel as it does around the circles in Washington. The total number of intersection movements occurring formerly at the one point would be divided between four points in a manner which would eliminate all holding of one-direction traffic while permitting the other-direction traffic to pass. This same scheme could also be used effectively in large cities to alleviate congestion at various outlying heavy-traffic intersections which are of much the same character as the one main intersection in a smaller city. The merchants located within the square would probably object, but the harmful effect on them would be questionable, while the advantage to every one else would be real and apparent.

Railway managers should make periodical speed observations on all sections of their lines where there is much congestion, and it is safe to say that if this is done startling results will often be obtained. Car-hours will pile up rapidly on an obstructed street, and in that case the thing to do is to appeal to the authorities for relief.

Adjusting Service as Traffic Changes

A CERTAIN railway company was operating three-fourths of its cars over the full length of a route and the remainder of the cars were turned back about three-fourths of the distance out. Traffic surveys showed that the interests of the riders on that line would be better served and thousands of car-miles saved annually if 50 per cent of the cars were turned back at a point midway between terminals. This recommendation was made to the management, but was not acted upon because there was no crossover at the street where it was proposed to "short line" part of the service.

Here is an instance of short-sighted economy which unfortunately is too common among railway men. A system is laid out originally with crossovers and other special work placed for the existing needs of service. In course of time the riding habit of patrons of the various routes changes and common sense indicates that the service should be graduated to meet their demands. Here comes the question of installing some new special work at a certain cost or of wasting that much or more annually in unnecessary car mileage.

It is one thing to have the defects of a system pointed out and another thing to act upon them. There is a field for traffic study on every railway property, and the deficiencies are usually more readily apparent to a trained expert who comes on to the system with a fresh viewpoint, free from operating responsibilities and with no local prejudices. Such an engineer will consider the traffic characteristics of a line and determine whether there is any excess or shortage of service on the system as a whole or on any of its parts. He may find that seats exceed passengers even in rush hours and the natural remedy would be curtailment of service. Some lines will be found with slower speed than others, and if this is not due to more short-haul riders or a greater number of traffic interferences, the schedule should be shortened. Excessive layover time may be found and if this is not called for by contract with the employees, the pruning knife of the time-table maker should be applied. Some long lines may be found overlapping shorter ones, and again the traffic engineer might suggest elimination of duplicate service.

There are so many angles to be considered in the revision of schedules, however, that the railway executive is at times justified in "hastening slowly" even on the recommendations of a traffic expert. Local conditions have to be weighed seriously. Too sudden a shifting of service, even though warranted from the company standpoint, may not be good policy. The changes are more likely to "stay put" if they are made more slowly and thus not arouse public resentment. This does not mean that the company should mark time indefinitely while a real sacrifice of costly car-hours continues. Wasteful service will benefit no one, and the careful operator will know when and where to suit his facilities to the demands of the riders. This is the test of good judgment.

Is Public Ownership of Utilities Inevitable?

THAT it is, was the conclusion reached by an eminent engineer in a paper recently presented at a society meeting. Many good reasons were given to show that this is the logical outcome of present conditions. Thus the fact was pointed out that the rates and consequently the receipts of the companies are absolutely controlled by the authorities, while the expenses are also very largely determined by them or by circumstances over which the utility has no control. With service at cost, which is now coming into more general use, the argument perhaps is even stronger, and the author of the paper mentioned pertinently inquired what is the use of the stockholders when all business risk has disappeared. Why not simplify the relationship by having public management function direct? he asked.

Undoubtedly private ownership in such circumstances is somewhat of an anomaly. Its excuse is that public ownership of utilities under the political conditions which exist in most of our cities is still more of an anomaly. The fact is that the American municipality is not organized to conduct a commercial enterprise efficiently. The city fathers, as a rule, are not chosen for their business sense but for their ability to get votes. These two qualities rarely go together. But even if the business knowledge of the average city council and mayor was adequate to the task, if they agreed to discard politics in their management of the property, and if they had the courage to carry out such a program, there would still be the fatal weakness in municipal operation of frequent change in administration.

Service at cost, although it may have its drawbacks in the way of reduced incentive, has its continuous administration which can be kept keenly attentive to its work by the city transit administration. There are thus two interests, the railway and the city executive, watching each other, so that there is far less likelihood of the utility failing to do all it can than if the business was conducted by the city officials only, with no one with sufficient interest or authority to watch what they were doing. Finally, there is far less opportunity for politics to influence a private management, practically irremovable during good behavior, than a political management dependent for office on popular vote every two or more years.

Private ownership and operation may have its defects in the way of efficiency and economy, but that of the public would be much worse.

Cash from Casuals, Tickets from Regulars

A COMPILATION recently made by the statistical department of the American Electric Railway Association shows that in 1920 fifty-seven cities with a population of 25,000 or more were charging a 10-cent base cash fare, as against only twenty-five in 1919 and none in 1918 or 1917. The number of cities with other fares higher than 5 cents were as follows: Six cents in sixty-one, 7 cents in eighty-nine, 8 cents in twenty-three and 9 cents in four. The compilation also shows a considerable increase in the number of companies in cities above 25,000 population which are selling tickets at a lower rate than the single cash fares. These cases are especially numerous where the cash fare is 7 cents or more. The tendency toward a 10-cent fare is especially marked in the eastern part of the country, while that toward a ticket rate applies to all sections. The ticket rate generally has not been put in as a reduction over a previous cash rate but at the time that the cash rate has been increased, and its purpose evidently has been to make the increase more acceptable to the frequent rider.

One great advantage of the 10-cent fare, whether accompanied by the ticket plan or not, is that a single coin or token may be used to pay the fare. This is an advantage for both passenger and company. In fact, it was to retain this advantage that so many companies held on to the 5-cent fare long after it became inadequate. The single coin is a time saver both to the conductor and the passenger, and as the 10-cent coin is the one of the next higher denomination to the 5-cent nickel it possesses obvious advantages from this point of view.

The principal argument against the 10-cent fare for a uniform fare is of course its amount and the extent to which it may discourage traffic, particularly the short-haul business. It is not the purpose here to discuss the relative merits of flat fares versus zone fares for urban service to stimulate short-distance riding, but the question of tickets and cash fares in a property which has a flat fare. For such conditions many companies favor the 10-cent fare and believe that the benefit of any reductions should go to the frequent rider through the establishment of a ticket rate. Such a plan makes the casual customer and the stranger pay the higher retail rate, whereas the regular user gets the discount usually accorded to wholesale purchasers in other lines of business. Another advantage of the ticket rate is that it allows changes of small percentage in the rate, either up or down, by a change in the number of tickets sold at a stated price.

The new plan of the Boston Elevated Railway now being tried in Malden and Everett carries out the policy outlined so far as the single coin fare is concerned because 5 cents will be charged for the local suburban ride, while 10 cents will be charged for the long urban ride into Boston.

More Business for the Interurbans

MORE business requiring more car-miles of service and resulting in better car-mile earnings is what is most needed by the interurban railways. But how can it be had?

More business can be secured if a company is prepared to go after it determinedly with the kind of service that is wanted. This means prompt and efficient freight service and fast, comfortable passenger service with a very great extension of through runs. The matter of service is now more important than ever because the steam railroads, faced with a tremendous falling off of both passenger and freight haulage, are going to almost any ends to secure business. This applies particularly to the freight business, where it is always possible to make offers of service more attractive to shippers than given heretofore, and to make good on such offers during dull times. This points to the absolute necessity for the electric freight carriers to be very much "on their toes" in keeping the service up to a high order of excellence for present patrons, and in waging a very energetic campaign for any new business in sight. In other words, the competition of the present time is extremely keen, and it can be met only with a traffic department that is wide awake and backed up by an operating department well aware of the kind of service it must deliver to meet the situation.

Cultivation of the farmers is productive of a good quantity of profitable business. The farmers of Indiana wanted electric freight service badly enough to secure passage of a bill permitting the interurbans to haul livestock through the streets of any city. The service which the electric lines can give the farmer saves him money through substantial reduction in shrinkage of stock. This kind of business, together with all of the sugar-beet, garden produce and dairy product shipments that may be secured (and best secured by encouraging the building by the farmers of community sidetracks) makes a total of freight tonnage well worth going after. Little informal way-station meetings of an official of the company with a group of farmers, serving to give the latter an intimate contact with the company and an opportunity to voice their needs and petty complaints, are of wonderful value in winning friends for the company and incidentally business.

Special attention to through train service as a means of increasing the passenger business is worthy of consideration. Two recent efforts along this line will show in fewest words what can be accomplished. Two new fast through trains between Indianapolis and Fort Wayne recently inaugurated were carrying seventy-five passengers a day each way in less than thirty days, and it soon became necessary for the cars to haul trailers. During the first forty-five days of operation, only three trains were late. The cars are cleaned inside and out at each end of the trip, as with the treatment given in the yard service of the Pullman cars. The character of service undoubtedly had a great deal to do with the success attained. More recently the through service inaugurated between Indianapolis and Louisville, with fine new cars running on a fast schedule, has met similarly with almost immediate success.

These are just a few of many things that are available for interurban lines to do to improve their financial conditions. It is not as though there were nothing left to do. The main point is to get busy and set aside the old obstacles that have been permitted for years to stand in the way. If there is determination, it will be found that most of these obstacles are not controlling.

Take Up the Slack in the Railway Industry

MR. HOOVER was the logical man to head an investigation into the causes of industrial waste. His regulations during the war, exemplified by his call for a "clean platter," taught the public the evils of waste, and it is notable that the first extended undertaking of the Federated American Engineering Societies under Mr. Hoover's direction should be to study the causes and attempt to reduce the waste in industrial undertakings. There are many of these causes of industrial waste. They include unemployment, failure to secure maximum output from the individual due to misfit or other cause, lack of standardization, mismanagement, failure of industries to co-ordinate, and so on. All of these are being studied in ten representative industries by the Federated Engineering Societies to see what relief can be obtained.

The electric railway industry should profit directly and indirectly from this investigation—directly from the lessons which will be derived, indirectly because in periods of business stress its traffic falls off, since the public does not have the money to spend on carfares. The benefit to the nation of having all its productive energies utilized, or with even half of the present waste eliminated, should be tremendous. Waste is the biggest tax the nation has to pay, and it is hard to imagine anything which would add more to our national prosperity than greatly to reduce the size of this tax.

The railway industry will be prepared to do what it can to co-operate when the report of this committee is rendered. In the meantime causes of wastes where detected should be removed in the general interest.

Quotation from the Federal Electric Railways Commission Report

No. 14

THE commission is unanimous on this point: That there has not been sufficient experience with public ownership and operation of street railways in this country to enable us to recommend it as a permanent solution of this problem. In some of the foreign countries it has apparently worked well. We do not believe under present conditions that this method of operation would be successful in most of the cities of the United States today.

* * * * * *

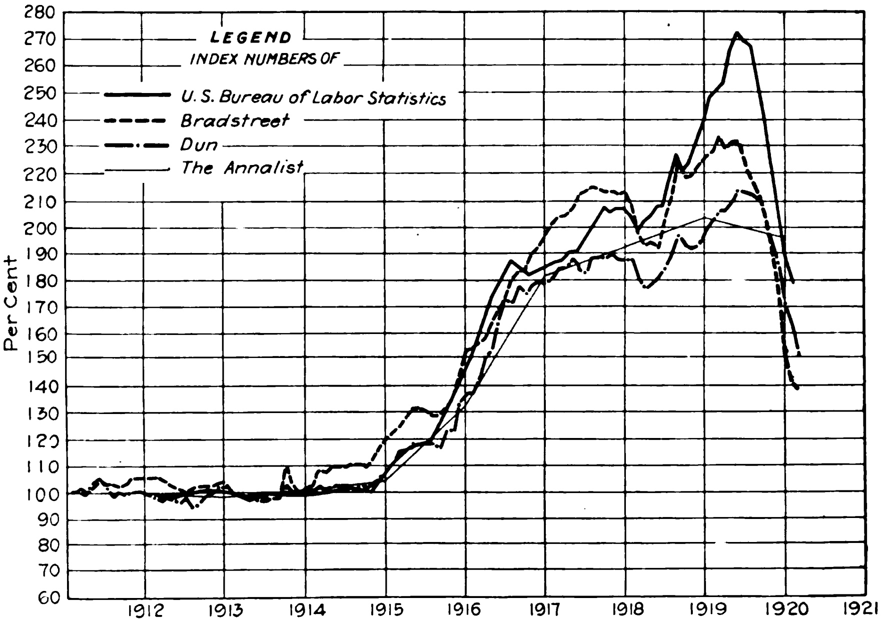
We are certain that much can be accomplished by private initiative, stimulated and aided by thorough public regulation; that the final solution could, in many communities, be found under private management, and that in any event, the reforms which have been urged by the commission should be instituted, since those reforms would serve to place the relations between the street railway and the public upon a more just and equitable basis.

Living Costs and Wages

The Standard Index Numbers Are Charted by Months for the Period Beginning Before the War and Show a Marked Falling Off in Prices Since the First Half of Last Year—Figures Are Also Given for Wages and Unemployment

BY JOHN F. LAYNG
Member of the Firm of Hemphill & Wells, Consulting Engineers, New York

NEARLY every newspaper now contains some reference to wage reductions, decreased living costs and the financial embarrassment of the local traction system. The question naturally comes up, what can we find out about these things which are a matter of universal concern? Let us consider, first, the street railway situation. This can be understood in a few minutes, if we have the company's operating report. Very few of these companies have been meeting their capital obligations. Many have not had sufficient income to pay operating charges, the deficit being made up by borrowed money and deferred maintenance.



FLUCTUATIONS IN WHOLESALE PRICES OF COMMODITIES

The reason for so many unfavorable operating reports is the abnormal increase of labor and material costs within recent years without a corresponding increase of income. It is the purpose of this article to show the extent of this increase and the present trend of these prices.

There are definite and reliable guides of the trend of retail prices on which we can base our judgment. These are the index price numbers of the five leading authorities in this country, which are Bradstreet, Dun, the Annalist, the United States Bureau of Labor Statistics and the National Industrial Conference Board. Each of these will be considered individually.

BRADSTREET'S INDEX PRICE

Bradstreet takes the wholesale prices of ninety-six basic commodities, which are supposed to be representative of average price conditions in trade. These articles include breadstuffs and other foods, live stock, raw and manufactured textiles, metals, coal and coke, mineral and vegetable oils, naval stores, building materials, drugs and chemicals, and miscellaneous articles. The wholesale price per pound of each article is listed and the totals added. The grand total is Bradstreet's Price Index Number. If the figure for Jan. 1, 1912, is taken as 100 per cent, the wholesale high level price during the recent abnormal period was 233.1 per cent, this being on Feb. 1, 1920. On April 1 prices had dropped to 231.4 per cent, but on May 1 prices were 231.6 per cent. Since that time they have declined very rapidly and on Feb. 1, 1921, they had receded to 138 per cent. The various fluctuations month by month from 1912 to the present are shown graphically in the chart on this page.

DUN'S INDEX NUMBER

Dun's Index Number has the scientific foundation of a proper regard for the relative importance in per capita consumption throughout the country of each of the many articles used in its compilation. On the business day nearest to the first of every month about 300 wholesale quotations are taken, and these are separately multiplied by a figure determined upon as the estimated per capita consumption of each of the many commodities embraced by the record. The results are then grouped under seven heads, the total of all representing the actual cost of a given quantity of goods in the wholesale markets at the specified dates. Through the use of a per capita consumption factor in this index number, wide fluctuations in an article little used do not materially affect the total, whereas changes in the great staples have a larger bearing on the general result. The per capita consumption multipliers used do not change with the varying prices. If Dun's Index Number of January, 1912, is taken as 100 per cent the highest wholesale prices were reached in May, 1920, when the value was 213 per cent of the January, 1912, prices. Since then prices have continually dropped, until in February, 1921, the value was 150 per cent.

THE ANNALIST INDEX PRICE NUMBER

Wholesale quotations of twenty-five food commodities are used as the basis of this index number, the articles being so selected as to represent a theoretical family food budget. The prices used are New York and Chicago quotations. The index price number is obtained by computing the simple arithmetical mean of the relative prices of the different commodities.

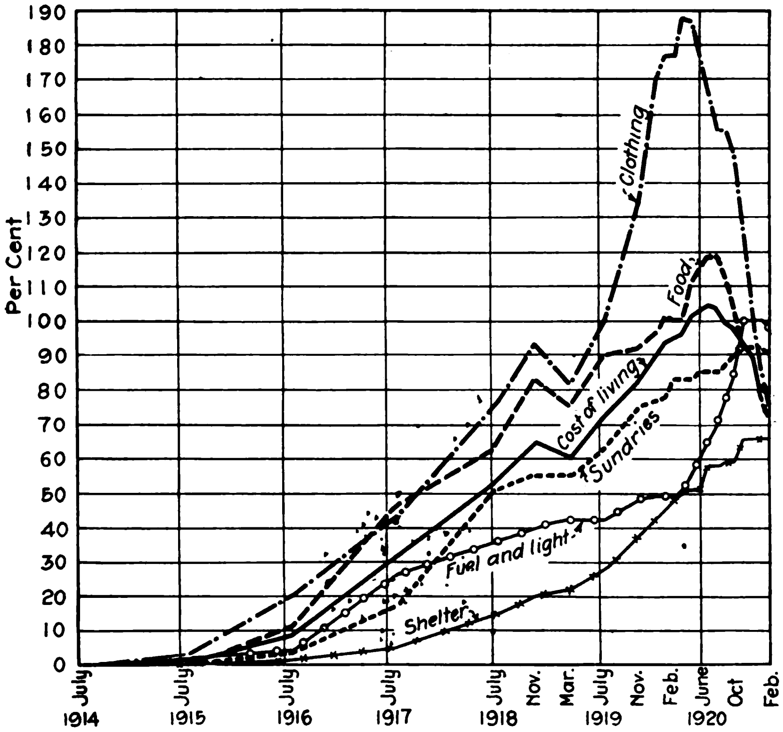
These figures, considered on year averages with 1912 as 100 per cent, showed the 1919 wholesale prices to have advanced to 203 per cent. The highest average price for any single month was in June, 1920, when the figure was 231 per cent of the 1912 prices. The average for 1921 up to Feb. 19, 1921, was 135 per cent of the 1912 figure. Year averages are given in the chart.

UNITED STATES BUREAU OF LABOR STATISTICS INDEX PRICE

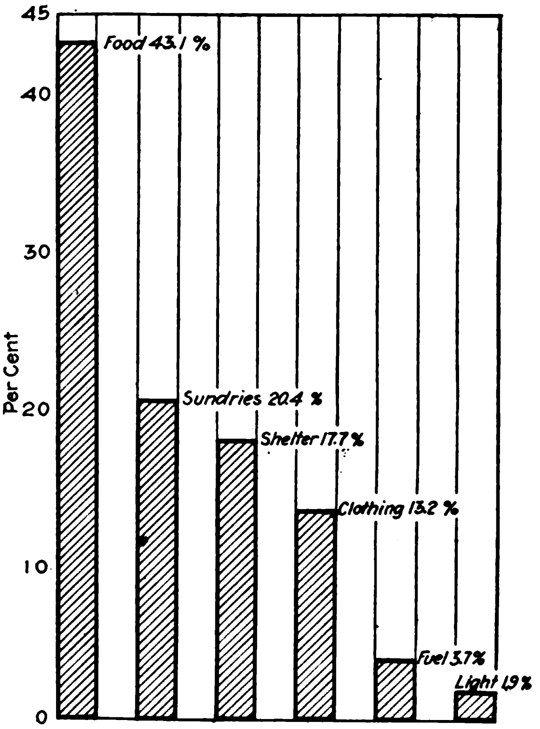
The wholesale price of more than 300 commodities are used as the basis of this index price, the quotations being principally at New York and Chicago. No attempt has been made to weigh the index number. Instead, it has been thought best simply to use a large number of representative articles, selected in such a manner as to make them to a large extent give the time value of price fluctuations in basic commodities.

NATIONAL INDUSTRIAL CONFERENCE BOARD

One of the important activities of this board is an investigation of living costs. One fundamental difference between its index number and those of Bradstreet, Dun, the Annalist and the United States Bureau of Labor Statistics is that the board bases its figures on retail prices rather than wholesale prices.



FLUCTUATIONS IN COST OF LIVING IN THE UNITED STATES AS REPORTED BY NATIONAL INDUSTRIAL CONFERENCE BOARD (PERCENTAGE ABOVE THAT IN 1914)



RELATIVE PERCENTAGES OF EXPENSE ITEMS COMPRISED IN THE AVERAGE FAMILY BUDGET

The relation of wholesale prices to retail prices is similar in many ways to the relation of retail prices to wage rates. There is a lag between the raising and lowering of wholesale prices and the reflection of this change in retail prices. Furthermore, retail prices are more a matter of personal selection than wholesale prices. This phase must be considered in any conclusion based on wholesale prices.

Another point of difference between the index figure of the National Industrial Conference Board and the other index figures mentioned, except Dun's, is that it represents a weighted average. The figure is made up of the retail prices for food, shelter, clothing, fuel and light, and sundries, weighted in the proportion which these have in the budget of an average family.

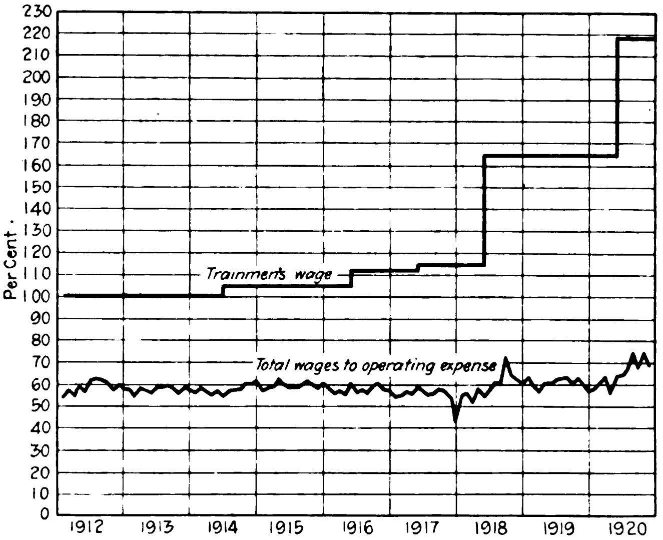
The food prices are obtained from the Statistical Bureau, United States Department of Labor. Clothing prices are based on data secured direct by the board from wide sources of information in various parts of the country. Prices for fuel, light, shelter and sundries are secured in the same manner as clothing prices. "Sundries" include carfare, doctors' fees, church contributions, organization dues, insurance, medicines, reading material, amusements, furniture, household supplies, candy, soft drinks and tobacco. The figure taken as the relative importance of these articles in the average budget is food 43.1 per cent, sundries 20.4 per cent, shelter 17.7 per cent, clothing 13.2 per cent, fuel 3.7 per cent, and light 1.9 per cent.

These figures and their total are shown graphically in the second chart. In this chart July, 1914, is taken as zero and the peak of retail prices will be found as having been reached in July, 1920, when the figure was 104.5 per cent above that of July, 1914. Since that time prices have been rapidly going down, and on the same basis as that just quoted the prices as of February, 1921, are 76.3 per cent.

The graph of costs of the National Industrial Conference Board shows that the principal reduction in living costs during recent months has been in food and clothing. Up to date the reduction in sundries, fuel and light has been small. The costs of these and of shelter are more involved than those of food and clothing, and considerable time will probably be required before they fully reflect the downward trend of prices. The public sentiment is also a large factor in the price of these items.

The highest prices for each of the various authorities were as follows: Bradstreet, February, 1920, 233.1 per cent; Dun, May, 1920, 213 per cent; the Annalist, June, 1920, 231 per cent; United States Bureau of Labor Statistics, May, 1920, 272 per cent, and National Industrial Conference Board, July, 1920, 104.5 per cent. As this last percentage represents the value above that of July, 1914, to be on a comparable basis with the others it should be read as 204.5 per cent.

Trade papers state that the prices of commodities in Great Britain and other foreign countries are declining in practically the same ratio as here and any view of the situation should consider conditions on a broader basis than just what is happening in this country.



ABOVE, AVERAGE TRAINMEN'S WAGE RATE FOR TYPICAL COMPANY COMPARED WITH THAT PREVAILING IN 1912. BELOW, RATIO OF TOTAL WAGES TO OPERATING EXPENSE

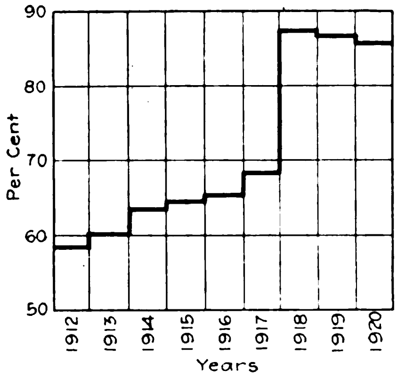
Only one conclusion can be reached from the charts shown. This is that wholesale prices have been off for some time and retail prices are rapidly going down and their trend is to a still lower level than the present. Several months are usually required before reductions in wholesale prices show up fully in retail prices. There is the natural tendency for the retail merchant to hold up his price at least until all the stock which he has purchased is sold. Again, his expenses for rent and wages, up to the present, have not been reduced in the same ratio as either wholesale prices or as the wages in industrial establishments. But as it is only natural to assume that the merchants' employees will receive a wage which will be in proportion to the other wages paid in the district, the cost of living in the near future will be in accord with the trend of wholesale prices.

WAGES AND UNEMPLOYMENT

In its January bulletin the United States Department of Labor declares that unemployment is at present assuming very serious proportions. In January, 1920, there were 9,402,000 employees in industry in the United States. This number for January, 1921, had decreased to 6,070,648, or 35 per cent. Other unemployed persons brought the total up to 37 per cent. The same bulletin reported general wage reductions in many cases of 20 to 33⅓ per cent. How far this will be reflected in wage rates for the electric railway industry is problematical, but if the cost of living is reduced in the same proportion as wages no personal hardship should result.

In 1912 the total wages paid to electric railway employees amounted to 50 or 55 per cent of all the operating expenses, excluding taxes. At present this figure has advanced to from 67 to 75 per cent. This increase in wages with the increased material cost coming at the same time are the two principal factors in making the adverse operating statements of practically all electric railways today.

Very few companies have received increases in fare rates that return a sufficiently large gross to overcome the increased operating costs. A company which may be classed as typical of the industry illustrates the points mentioned. The results of increased wages paid and the percentage of trainmen's wage rates are plotted in a fourth graph which shows about 72 to 75 per cent of total operating costs. The operating ratio for this company advanced successively year by year from 58.5 per cent in 1912 to 87.25 per cent in 1918. For 1920 this figure was 85.5 per cent. The margin between success and failure of a street railway as measured in operating ratio is in reality very small. Before the days of abnormal costs, generally speaking, a company having an operating ratio below 60 per cent, all expenses being included, was considered as making a good financial showing, while one with an operating ratio of 70 per cent or above was thought to be headed for a receivership. So it can be realized that a difference of 15 per cent spells failure or success.



OPERATING RATIO FOR TYPICAL COMPANY, SHOWING ADVERSE EFFECTS OF RISING COSTS

CONCLUSION

When one views all the evidence at hand the conclusion is that the cost of living will come down. Wages in all probability will be revised downward, but if the living cost is down, a corresponding reduction in wages ought not to be considered as serious by the employee.

As living costs tend to become stable on a lower price basis, general contentment will increase and society at large will in all probability be better satisfied with the revised conditions. When a dollar approaches nearer to the old purchasing basis, the increased wage which we have had will not be so necessary.

Work of Committee to Study Waste in Industry Well Under Way

A RECENT statement by L. W. Wallace, secretary Federated American Engineering Societies, indicates that the work of the committee of that society appointed to study the causes of waste in industry and means by which it can be eliminated is well under way. Ten representative industries have been selected for study, namely: Bituminous coal, building trade, transportation, men's ready-made clothing, printing, paper, metal trades, textiles, shoes and rubber. From three to ten plants of each elected industry are being visited by an experienced engineer under the direction of the committee. From the information obtained the committee hopes that it will be able to determine the extent, causes and remedy for unemployment.

Railroad Engineers Meet in Chicago

At Twenty-second Annual Convention of American Railway Engineering Association Held in Chicago March 15-17 Committee Reports Were Presented Covering Wide Range of Topics—Those of Particular Value and Interest to Electric Railway Engineers Are Abstracted in This Article

THE committee reports presented at the twenty-second annual meeting of the American Railway Engineering Association held at the Congress Hotel, Chicago, from March 15 to 17, contained a mass of material of value in the electric railway field. Abstracts of a number of these have been prepared from the point of view of the engineers interested in railway electrification or of the way engineer.

In discussing the report of the committee on electricity E. B. Katté, chairman of this committee, said in regard to the specifications given for insulated wires and cables that these were not written to supersede the signal specifications, but that it was the desire to have one specification that is applicable to all the various uses of electric insulated wire, and perhaps this may be brought about in the course of a few years. The committee which made the test in connection with the result and analysis was made up of representatives of four or five railroads, the United States Navy, the United States War Department and four or five manufacturers and after years of research they have finally agreed on a procedure which is fairly accurate. The railroad specifications for electric wires and cables and the specifications for incandescent lamps were approved for printing in the Manual as recommended practice.

The report on economies of railway location was presented and outlined by C. P. Howard, chairman. The text included under Appendix A and the conclusions reached were adopted for insertion in the Manual. The remainder of the report was received as information.

The work of the ballast committee for the past year was largely in the nature of a review of the instructions given in last year's report as information and was presented this year for adoption and inclusion in the Manual. Appendices B, C, D and E were adopted for printing in the Manual as recommended practice.

Nine subjects were assigned to the track committee this year and reports were presented on six. Recommendations adopted for printing in the Manual as recommended practice included spikes, both the $\frac{5}{8}$ in. and $\frac{9}{16}$ in.; specifications for switches, frogs, crossings and guard rails; a revision of tables of turnout leads and the plans of standard frogs.

An important development of the meeting was a letter sent by the chairman of the committee on rail, G. J. Ray (D., L. & W. R.R.), supplementing the committee's report. Mr. Ray, who was unable to be present, stated that no rails have yet been rolled to the specifications adopted in 1920 owing to the action of the manufacturers, who will not accept these specifications for rails of more than 110 lb. per yard and will only meet them for rails of less weight subject to certain modifications and an extra price. Mr. Ray believes that some of the claims of the manufacturers are reasonable, but on the other hand they have offered no constructive criticism of the specification. Their general attitude is that their own specifications and the 1915 specifications of the association are satisfactory, that the 1920 changes will prove costly without improving the quality of the rail and that railways are not sufficiently interested in securing better rails to pay the extra cost of production. No action was taken or requested, but the committee this year will consider whether to adopt two specifications (for different grades of rail) or to adopt a single specification which will not require extra cost but will be accompanied by a list of specific requirements and their probable cost, for the benefit of railways requiring rails of higher grade.

The report of the committee on wood preservation this year was full of information without any recommendations for the Manual. A part of the report that should appeal to all maintenance engineers is that given in Appendix A on service testing records. These records have been compiled from experimental track in most cases and cover three different treatments.

Electricity and the A. R. E. A.

TAKING up first the problems of power distribution as covered in the report of the committee on electricity, it may be noted that this committee, of which E. B. Katté is chairman, gave the results of its year's studies on such topics as electrolysis, water power specifications for insulated wires and cables, electrical interference, underground conduit construction, etc. As recommendations for new work, the committee suggested co-operation with the United States Geological Survey in connection with the "super-power survey" and also with the Water Power League of America and advocated study and report on overhead transmission and distribution line construction for railroad use, with a view of preparing plans and specifications for aërial construction, working with appropriate committees from the signal section and telegraph and telephone section of the American Railway Association.

In reporting on the protection of reinforced concrete from electrolysis, the committee stated the conclusion that the protection of a concrete structure with a waterproof shell is preferable, because this not only safeguards the reinforcing bars from moisture and later oxidation, but also protects the concrete surrounding the rods from abrasion and eventual exposure of the bars. The inside of the protecting shell should be waterproofed with pitch having a melting point about 200 deg. F. and of specified flexibility. Material of the required kind has been manufactured for twelve years or more, but has not generally been used for waterproofing but mainly as roofing material and in pavements. It is necessary not only to inclose the sides of the reinforced concrete structure with a waterproof shell but also to protect the top or any other portion that is exposed by means of a waterproof pitch.

The sub-committee on water power presented data regarding the Norfolk & Western Railway electrification, which was stated to have been decided upon primarily to secure greater facility of movement in a given time. It has also developed that the economy of electric operation is an important factor. Provision was made for interchange of emergency power between the railway steam plant located near Bluestone and the Appalachian Power Company's plant at Switchback. Charts were given in the report for typical fall and spring days, showing respectively for the two the following data: Total alternating current kilowatt-hours generated, 25-cycle, 353,500 and 249,800, and 60-cycle, 936 and 1,056; total alternating current kilowatts load for five minutes, 18,500 and 21,000; average power factor, 70 per cent and 65 per cent; load factor for five minutes, 79.6 per cent and 49.5 per cent; load factor for one hour, 85.6 per cent and 72.7 per cent. The high load factor in the first case is due to a large supply of emergency power to the power company.

The outstanding features of the Norfolk & Western electrification are the irregular spacing of trains and the ability of the generating equipment to supply large blocks of power on short notice. There have been instances where the power-house load has increased from 2,000 kw. to 25,000 kw. in less than five minutes.

Previous to electrification a standard tonnage train of 3,250 tons required three Mallet locomotives up a 2 per cent grade, making an average speed of 7½ m.p.h., while with electric locomotives the same train is handled by two engines at 14 m.p.h. Under steam conditions the round trip time of a crew out of Bluefield averaged twelve hours, while with electric operation it averages seven hours. Under steam conditions the time required to prepare a Mallet locomotive for a trip was from ten to twelve hours, while with electric locomotives forty minutes is allowed.

The report also gave comparative costs of steam and electric operation on the basis of 1,000,000 tractive miles, "tractive miles" being the product of the maximum tractive power in pounds and the total miles run. The respective amounts for steam and electricity for the several items of cost are as follows: Interest and depreciation $4.36, $12.16; repairs $7.64, $6.40; fuel of electric power at locomotives $13, $6.19; lubricants and wastes 16 cents, 5 cents; supplies 16 cents, 16 cents; engine-house expenses $2.18, 56 cents; water 51 cents, nothing; wages $1.89, 70 cents; total per 1,000,000 tractive miles $29.90, $26.20; saving by electric operation 12½ per cent.

With regard to fuel saving, the Norfolk & Western found that the modern Mallet compound superheating steam locomotive, equipped with all improvements except feedwater heaters, uses about 5.4 lb. of fuel per drawbar horsepower-hour, taking into account road conditions and allowing for standby losses, and assuming the engine to be in fairly good operating condition. With electric operation about 3.3 lb. of fuel is required. The annual saving for the present Elkhorn grade electrification is about 60,000 tons of fuel coal per year. The corresponding saving for the entire Norfolk & Western system would be nearly 1,000,000 tons per year. For the period January to June, 1920, the total mileage for an average of eight locomotives was 224,974, or 135 miles per locomotive per day. The kilowatt-hours at the power house per locomotive-mile averaged 160, and the watt-hours per trailing 1,000 ton-mile, 165.

After giving the Norfolk & Western data, the subcommittee concluded as follows:

1. That the use of 44,000-volt, single-phase, 25-cycle transmission of electric power with 11,000 volts single-phase on the trolley wire is practicable for electric train service for heavy grade and heavy tonnage.

2. That the average daily gross tonnage of freight eastbound over the electrified grade on the Norfolk & Western for 1918 was 47,500 tons as compared with 32,000 tons in 1912, an increase of about 50 per cent. The ultimate capacity based on the present installation is stated as 80 per cent over that of 1912.

3. That such a system of electrification will probably effect the saving of at least 12½ per cent of the total annual expense as compared with steam operation on a railway with similar characteristics.

4. That the introduction of electric locomotive with electric brakes (regenerative braking) has made possible higher speeds on heavy grades with greater safety and reliability under all climatic conditions.

In addition to the report of the committee on electricity there was a section of the report of the committee on economics of railway location which discussed electrical equipment. This is abstracted on pages 634 and 635. It relates to the economics of location as affected by the introduction of electric locomotives.

ELIMINATING ELECTRICAL INTERFERENCE

Another sub-committee, charged with the duty of reporting on recommended practice for eliminating, so far as practicable, interference with telephone, telegraph and signal lines caused by propulsion circuits and adjacent transmission lines, gave the results of a questionnaire. No conclusions were drawn, but the interference situation on a number of roads was summarized.

On the New Haven Railroad a "three-wire" system of distribution is used, with the terminals of 22,000-volt auto-transformers connected to the overhead wires, the center point of these transformers being grounded to the rail. One terminal of the transformers is connected to the trolley wires, the other to the feed wires. Communication circuits are cabled in the electrified zone. Under normal operating conditions telephone circuits are quiet, but on the occasion of a heavy short circuit on the traction system, so-called "acoustic shocks" have been experienced. To minimize these, drainage coils have been installed at various points along the line, these coils consisting of resistors or condensers in series with retardation coils. No trouble chargeable to induction has been experienced in connection with the automatic signals.

On the Philadelphia-Paoli electrification booster transformers were installed to prevent leakage of current from rail to ground, but were found of little value and practically all have been removed. All telephone and telegraph circuits are underground. Resonant shunts are used around relays on the telegraph circuits which provide a bypass for 25-cycle current. On the Philadelphia-Chestnut Hill electrification no booster transformers were used and no trouble has been experienced in telephone and telegraph circuits.

On the Long Island Railroad, which is a direct-current third-rail electrification, the transmission feeders are parallelled by telephone and telegraph circuits throughout almost their entire length. The open-wire telephone circuits are transposed at regular intervals, usually about eight transpositions per mile. The only inductive interference in the communication circuits is an occasional trouble due to unbalancing of power circuits, usually of short duration.

On the Norfolk & Western the company's telephone and telegraph circuits are open wire along the right-of-way, forming a close parallel to the contact and transmission circuits. Under normal conditions the inductive interference has been overcome to a very large extent on telegraph circuits by installing drainage shunts. This in conjunction with the special booster-transformer installation on traction circuits has cut down interference to a minimum; the only direct protection on railroad telephone circuits is transposition.

On the Great Northern three-phase electrification through the Cascade Tunnel the transmission line parallels the pole line supporting telegraph and signal line circuits, generally at a distance of from 80 to 90 ft. Interference with telegraph circuits, which was troublesome at first, has been overcome by the use of a twisted-pair steel armor communication cable.

On the Erie Railroad electrification south from Rochester, N. Y., interference occurs on a section 19 miles north of the transformer station located at Avon and 15 miles south thereof. Normally there is no disturbance from the transmission line, but induction from the 11,000-volt single-phase line is heavy on all single telegraph wires which come into this section. Under abnormal conditions the troubles are accentuated.

On the New York Central Railroad, West Shore branch, there is a parallel between the railroad's communication circuits and the 60,000-volt, three-phase, 60-cycle transmission line for about 115 miles, which normally causes no trouble. Under abnormal conditions severe surges are induced in railroad communication lines. On the Falls Road branch a short parallel causes trouble only due to contact. There has been some interference due to irregular power conditions on the parallel 20 miles long on the Walkill Valley branch, and a similar trouble on the Phoenix branch. In the Grand Central terminal electric zone 11,000-volt, three-phase, 25-cycle alternating-current power is transmitted to nine substations, partly on aërial lines and partly in cables. The telephone and telegraph lines are in cables in the same sections where the power line is cabled. In other sections the communication lines are part cable and part open wire on the side of the track opposite to the transmission line. There has been no electrical interference with communication or signal service.

On the Chicago, Lake Shore & South Bend Railway, extending from Kensington, Ill., to South Bend, Ind., the railway company's communication and signal circuits are carried on the same pole line as the transmission circuit without trouble. The Postal Telegraph & Cable Company's line parallels this road between West Blair Farm and Baileytown. Only under abnormal conditions due to short circuits and grounds are momentary troubles experienced on the telegraph circuits. The trouble is greatest when the railway company cuts out its 33,000-volt lines and carries the whole load on the system from the 6,600-volt, single-phase contact wire. Nothing has been done by the Postal company which eliminates these conditions.

SPECIFICATIONS FOR CONDUITS AND CABLES

The committee on electricity also presented railroad specifications for underground conduit construction for power cables, recommending that it be approved and printed in the Manual of Recommended Practice. The committee further recommended that the report on the National Electrical Safety Code, which outlined the present status of the code, be accepted as information and published in the *Proceedings* and that the committee be authorized to continue its co-operation with the United States Bureau of Standards. The committee further recommended that railroad specifications for wires and cables, which is presented, be approved and printed in the Manual as recommended practice. In connection with underground conduits, three new electrical definitions were suggested as follows: A *conduit* or *duct* is a unit length of pipe suitable for use in the construction of runways for electric light and cables. A *manhole* is an opening in a splicing chamber through which a man may enter. A *mandrel* is a tool for aligning and cleaning ducts.

The above abstract does not take up all of the detail items of the report, but refers particularly to those which will interest electric railway men.

Economics of Location as Affected by Introduction of Electric Locomotives

AN APPENDIX to the report of the committee on economics of railway location C. P. Howard, chairman, gave a summary of the advantages and disadvantages of the electric locomotive, beginning with the statement that railroad electrification, while most desirable from the point of view of the conservation of our fuel resources, is a matter that cannot be taken wholesale on account of the capital outlay required and the individuality of the problems of different railroads. At the same time, recent improvements in the steam locomotive have increased its efficiency practically 50 per cent, while its size and capacity have increased correspondingly.

The electric locomotive eliminates the turntable, cuts down standby losses, removes delay at water tanks and coaling stations, is more readily available than the steam locomotive for service, and its maintenance cost is lower. Its capacity increases with cold weather, and the simplicity of its control permits the crew more closely to observe the track and the signals. When properly designed the electric locomotive is easier riding than the steam locomotive and can have a more uniform distribution of weight with less nosing and track pounding, all of which tends to lower track maintenance. In addition the electric locomotive can concentrate large amounts of power under single control.

In steam locomotive operation each train has its own source of power which has no relation to the propulsion of the other trains on the line. In electric railway operation every train draws its power from one or more centrally located power houses. Steam trains are handled by locomotives only; electric trains may be propelled either by locomotives or motor cars.

ADVANTAGES OF ELECTRIC OPERATION

The committee summarized the actual and claimed advantages of electric operation in substance as follows:

The smoke nuisance is entirely eliminated. The entire weight of the locomotive can be concentrated on the drivers. Tractive effort can be increased without decrease in speed. Train weights from 18 to 25 per cent greater than is possible with steam locomotives can be hauled. The electric locomotive does not need to be taken out of service for cleaning, coaling, watering, etc., at terminals. Fuel consumption is low, but in comparison with steam locomotives all elements of power cost should be included. Unit cost of electric operation decreases with increase in volume of traffic.

The committee generally listed the handicaps to which the electric locomotive is subject somewhat as follows:

Electric equipment is costly, and it must bring about a great reduction in operating cost to justify its use. The electric locomotive is a transforming apparatus and is subject to overload, which the steam locomotive is not. Electric operation involves extra hazards to employees and others. An electrified system is liable to train delays inherent to the system, both due to equipment failures and power transmission line and power house failures. (The committee noted, however, that these delays are rare.) With electric traction, alternating-current track-circuit apparatus must be used for signals. Normal traffic cannot be exceeded for long periods unless the system has been designed to take care of maximum traffic. The power system load factor is apt to be low unless other load is carried. Electric locomotives are limited in their field of operation strictly to electrified track and so do not have the element of interchangeability possessed by steam locomotives.

As to comparative efficiency of the electric and steam locomotives in the matter of failures, the committee stated that the electric locomotive seems to hold its own. However, the steam locomotive has recently become a more formidable competitor due to the development of improvements, particularly the various outside valve gears, the superheater, the brick arch and the automatic stoker. It would appear that the ton-miles moved by 6½ lb. of coal in a steam locomotive are approximately equal to what can be moved by 1 kw.-hr. delivered from a power station, varying of course with the quality of the coal. In most cases the profits from electrification must be realized indirectly rather than directly, for example, from increased track capacity and the like. Steam railroads will generally consider electrification favorably when the reduction in operating expenses will pay the interest on the necessary investment; also when the track capacity must imperatively be increased, and this increase can only be supplied by a large additional expenditure or by electrification.

As to location economics, the introduction of electric traction will require changes in the economic values heretofore assumed under the classified heads of "distance," "rise and fall," "curvature" and "rate of grade." These topics were discussed in the report in some detail. The committee concluded that, taking into consideration heavy fixed charges of investment, no general conclusion can be given at this time as to the relative economies of electric and steam operation. Each case must be considered by itself, with due regard to all elements of cost and expense, both special and general, as well as operating conditions and the public comfort and safety.

Committee Reports on Way Matters

THE following abstracts cover the reports on track and allied topics. For convenient reference they have been arranged under the committee titles:

Committee on Ballast: The committee presented revisions of subject matter in the Manual; intruction for ballasting on operated line; specifications for stone ballast material and washed gravel ballast, recommended designs for standard ballast tamping bar, pick and fork. A design of standard ballast shovel was submitted for study.

Committee on Stresses in Track: A progress report was made stating that important information on stresses developed in curved track is in process of preparation for future report.

Committee on Rail: The committee presented its customary report on rail failure statistics. Continued effort has been devoted to the search for the causes of transverse fissures. The investigation has indicated that the trouble may ultimately be traced to shrinkage cracks which occur during cooling, after passing the hot saws. A critical study is being conducted to determine the influence of mill practice on the properties of rails. The committee submitted new rail record forms to replace those now in the Manual. Some tests by Dr. Dudley show that there is a high residual ductility in rails even after five years of severe service. It is stated that tests for determining intensity of pressure on rail heads show that the pressure is least where the wheels are worn slightly concave.

Committee on Economics of Railway Labor: This committee stated that very little is being done by the railroads in exercise of care in selection of maintenance labor. There should be immediate action looking toward improvement of the labor situation and organized effort must be put forth to increase labor efficiency through education and training. The average age of roadmasters and track supervisors is forty-five years. Fifty per cent of the roadmasters and supervisors have had some engineering training. They each have charge, on an average, of 111 maintrack miles and 75 sidetrack miles. Ninety per cent of the common labor is composed of native white men. The average length of track section per foreman is 6.7 miles maintrack and 3.1 miles sidetrack.

Committee on Standardization: A new and special committee has been appointed to assist in the promotion of the use of the association standards. The committee is to review specifications heretofore adopted and suggest subjects which need joint study by the several standing committees. The committee is also to suggest items of railway material which should be covered by standard specifications.

Committee on Uniform General Contract Forms: A number of revisions of the contract form now in the Manual were proposed. A tentative form of license for wires, pipes, drains and conduits on railroad property was submitted for criticism. A form of lease agreement for industrial sites was recommended for adoption.

Committee on Signs, Fences and Crossings: A number of changes were recommended in the specifications for standard right-of-way fences. Designs were submitted and recommended for adoption, covering a number of signs for mileposts, section sign, bridge numbers, etc. A tentative specification for highway grade crossings was submitted and a summary of the requirements and practice in the various states and in Canada was presented. There was also an extended discussion of crossing gates, warning signals, wigwags and bells. A matter of particular interest is the revision of the statement of laws relating to separation of grades at highway crossings. Electric railways are subject to these laws and this information forms a valuable record of the variations in the laws in apportioning costs and methods of procedure. The bibliography on elimination of grade crossings should be of great assistance to engineers having occasion to gather information on the subject.

Committee on Ties: A number of changes in definitions were recommended. None of the railroads use the specifications for cross-ties and switch-ties now in the Manual. New specifications have been prepared and submitted for adoption in lieu of those now in the Manual. It is recommended that test sections for obtaining records of tie life be put in "out of face" and that not less than 100 ties of each kind be installed.

Descriptions of methods of inspection and the essentials for keeping adequate records were presented as information, and there was an extended discussion of the relative merits of various sizes of ties.

The subject of substitute ties received a good share of attention, and the committee called attention to the desirability of extended tests, believing that the engineering departments should take a more active interest in the development of substitute ties. Records of the various ties now under test were brought up to date. The committee called attention to its special report on the "Relative Merits of Metal versus Wooden Ties." This report was abstracted briefly in the ELECTRIC RAILWAY JOURNAL last year.

Committee on Iron and Steel Structures: This committee presented rules and unit stresses for rating existing bridges for approval. These rules have been under discussion for several years. The formula for impact is of particular interest to bridge engineers. Also, the principles applying to membrane waterproofing of bridge floors were discussed and submitted for approval. Particular attention must be given to drainage, reinforcement flashing and protection.

Committee on Water Service: The study of regulations relating to supply of drinking water on trains or premises of railroads brings out the fact that federal and state authorities are taking an increased interest in matters pertaining to drinking water supplies. The sanitary handling of such water is said to be in need of careful consideration and should be considered as important as any question of safety appliances. The handling of water to and in containers is a source of contamination. The Bureau of Public Health Service, United States Treasury Department, has requested that water containers be so constructed that ice does not come in contact with the water. The committee submitted specifications for substructures of wood and steel for water tanks for adoption and insertion in the Manual.

Committee on Wood Preservation: A report is made on Florida pine ties of the Public Service Railway which were treated with water-gas tar, fuel-cell treatment and installed in 1911. None has been removed to date and ties are in good condition. The availability of sodium fluoride as a preservative was discussed and the "toxicity" of the material was stated to be twice that of zinc chloride. More experimental installations are desirable.

The attacks of marine borers on piling is more extensive and more severe than formerly. Limnoria and toredo are particularly active. Creosote treatment is quite effective as a protection in some places but in others it is often inadequate and mechanical protection must also be applied. Creosote has so far not been found to stop attacks of limnoria. Various methods of mechanical protection, such as vitrified pipe, cast-iron pipe and concrete casings were described and illustrated in the report. Studding the piles with nails has been found to give protection against the toredo. Bark left in place offers protection for some time.

Committee on Wooden Bridges and Trestles: The committee reported that 16-in. stringers will be available for a long time to come. It is a depth largely used. Piles for trestles should have at least 14-in. butts and be driven to be safe for a load of 15 tons plus impact. The recommended sizes for stringers, caps, posts and sills are given covering Cooper's E45, E55 and E65 loading. Ties should be 8 in. x 8 in. x 10 ft. not dapped, and spaced 12 in. centers. Guard timbers should be 4 in. x 8 in.

Specifications for classification and grading rules for timber and lumber used in maintenance-of-way work were recommended for adoption. A table of allowable working stresses for structural timbers was presented. This covers a large variety of timber species.

Committee on Masonry: Conclusions were presented by this committee covering use of concrete for sea water work. Particular care must be given to designs to avoid sharp corners, offsets or pockets tending to obstruct flow of waves and floating objects. A very dense, impervious aggregate is desirable and the component parts must be carefully selected. Especial attention should be given to design when reinforcement is used. No steel should be nearer than 3 in. to any surface and not less than 4 in. from any two adjacent surfaces.

Committee on Economics of Railway Location: A number of interesting diagrams, tables and conclusions were presented by this committee for adoption, covering the resistance of trains running between 35 and 75 m.p.h.

Committee on Shops and Locomotive Terminals: An extended progress report on design of car shops was presented. A variety of designs of existing shops were illustrated, with a number of tentative conclusions covering such matters as track centers, space allowed per car, supply tracks, clearances, headroom, doors, paint shops, lighting and heating.

Committee on Track: Under "Revision of Manual" some slight changes were recommended by the committee in the design of cut track spikes. The design originally adopted did not show certain details correctly. Designs for $\frac{5}{8}$-in. and $\frac{9}{16}$-in. spikes were presented for adoption. It is reported that these spikes can be made in automatic machines. There had been some trouble about this with the earlier design.

Specifications for switches, frogs, crossings and guard rails were presented for adoption. There were many points in these specifications which are similar to those adopted by the American Electric Railway Engineering Association covering plain bolted special trackwork and materials for manufacture of special trackwork. Data for laying out bolted rigid frogs, railbound manganese-steel frogs and solid manganese frogs are presented and recommended for inclusion in the Manual. Standard dimensions for solid manganese frogs, tables of practical and theoretical turnout leads were also included in the recommendation. An elaborate progress report was made on gages and flangeways for curved crossings. Tentative specifications covering tie plates were presented for criticism.

Committee on Roadway: Subsidence and shrinkage of embankments were reported on extensively by this committee. Some subsidence occurs under an embankment except those built on rock. It is due to displacement or compression of earth under embankment. It must always be expected in swamps, marsh, bogs and any land where there is standing water. Shrinkage is composed for four elements: Wastage due to loss in haul; due to wind erosion; water erosion, and compression. The latter is by far the largest factor. The customary allowance of 10 per cent of shrinkage of earth is very nearly correct. Swell is often found in rock or shale. This may be as great as 60 per cent. No rule for swell can be given for general use. Specifications for corrugated metal culverts were presented for study. These culverts can be used to advantage in numerous instances. A number of conclusions on drainage of wet cuts were presented together with a number of illustrations of methods which are recommended for providing such drainage.

Committee on Economics of Railway Operation: The report of this committee is too elaborate to admit of an abstract which would do it justice. Of interest in connection with "human engineering" is a report on methods for increasing efficiency of employees by furnishing them with reports and comparisons. Methods for increasing traffic capacity of a railway were the subject of valuable studies presented as appendices to the report. The effects of speed on costs of track maintenance and on cost of transportation and cost of maintenance of equipment are subjects treated in Appendix C. It is evident from these reports that speed costs money and requires a better standard of maintenance. Quite definite increases in expense may be expected; operating speeds increase in way department accounts and these run through all of the maintenance accounts from superintendence down.

Committee on Rules and Organization: A manual of instructions for the guidance of engineering parties and a manual of rules for the guidance of employees of the maintenance-of-way department were recommended for adoption. These are to replace all matter on rules and organization now in the Manual. The instructions for engineering parties are very thorough and should be in the hands of all railway engineers. The manual of rules for way employees is prepared with the view of covering matters broadly so that they may be used as a basis for the rules of any way department.

Under the head of "Science of Organization" the committee presented the fundamentals of organization and outlined the two general types of organization now in vogue, namely, the line type and the staff type. Diagrams or charts of these are given and the charts show the workings of the two divisions of the line type as used by railroads, *i.e.*, departmental and divisional.

Double Circuit Breaker Safety Switch

THE Cutter Company, Philadelphia, Pa., has just placed upon the market a new type of inclosed circuit breaker which serves not only for protection from overload but also acts in place of a double-pole switch. The new device, which goes under the name of "U-re-lite," consists essentially of two circuit breakers, one on each side of the line, inclosed in a steel box. The switch is operated by first turning a handle on the outside of the box to the left, which closes one of the single-pole circuit breakers. Turning the handle to the right closes the other circuit breaker. It is so designed that after one breaker is closed it is free to respond and instantly open the circuit, should the other one be closed against an overload or short circuit. It is this construction which makes the knife switch unnecessary. After the circuit is established, when actuated by overload or when tripped by hand by means of a knob, both sides of the circuit are opened simultaneously. This type of switch is manufactured in ampere ratings of from 2 to 60 amp., for use on either alternating or direct current of voltages of 250 or less.

Oklahoma Utilities Hold Convention

Utility Men of Oklahoma Optimistic—John W. Shartel, Oklahoma Railway, Says that Improperly Regulated Utilities Cannot Be Successfully Financed Nor Can They Give Adequate Service

THE most successful convention in the history of the Oklahoma Utilities Association came to a close on March 10 after a three days' session at Oklahoma City, Okla. It was attended by more than 300 utility operators and others interested. A spirit of optimism pervaded the convention in spite of the difficulties so many members are having in financing new properties and improvements. Nevertheless, the spirit of Western hospitality and enthusiasm prevailed. The public officials who addressed the meeting included Gov. J. B. A. Robertson of Oklahoma; Campbell Russell, chairman of the Oklahoma Corporation Commission; Paul Walker, referee of the State Supreme Court and former attorney of the Corporation Commission, and H. W. Hubenthal, chief telephone engineer of the commission. Paul P. Hayes, member of the Public Service Commission of Indiana, made the principal address at the banquet on Monday night, March 9. Other speakers were John W. Shartel, vice-president and general manager of the Oklahoma Railway; J. W. Ingison, Ingison Hydro-Electric Power Company, Minneapolis, Minn.; H. B. Wright, H. B. Wright Investment Company, Kansas City; C. J. Griffith, Little Rock Railway & Light Company, Little Rock, Ark.; William B. Way, secretary of the National Gas Association of America; James P. Barnes, Louisville Railway, and C. L. Mitchell, Minnesota Electric Light & Power Company, Cushing, Okla.

Officers of the association elected for the ensuing year are John W. Shartel, Oklahoma City, president; C. E. Devin, Apache, first vice-president; F. A. Willard, McAlester, second vice-president; William Mee, Oklahoma City, treasurer, and H. A. Lane, Oklahoma City, manager. An executive board comprising fifteen members was also chosen.

In an address, in response to a speech by Governor Robertson, Mr. Shartel declared that the utilities do not object to regulation, but it should be intelligently administered. He recommended a revision of the whole system of dealing with the utility question and predicted that with a reorganized electric system and adequate facilities the state would have an increased population of 750,000 within five years. Unless the public wishes to furnish the capital to finance these utilities, private capital must have its recompense. Private capital will not come in unless it has a promise of absolutely fair treatment. The great difficulty with the public utility situation is that the people have not yet grasped these fundamentals.

Headway Recorder Supplies Traffic Data

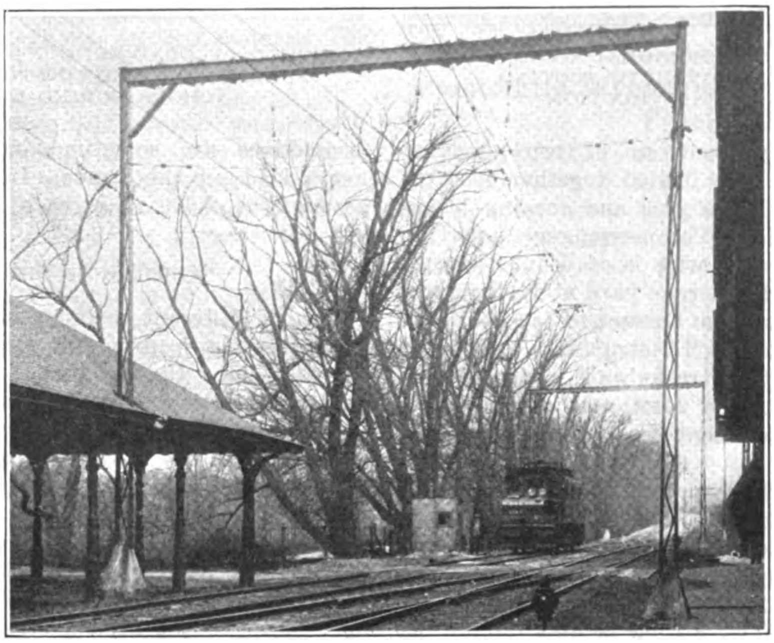
THE Youngstown Municipal Railway has installed a Nachod type R-2 headway recorder on one of its lines for the purpose of studying traffic and schedule conditions and securing data on interruptions to service. This device can be used either on single-track or double-track lines, for as a car passes under the trolley contractor, an impression is made on the chart which shows the time the car passed and also its direction. It is the plan to transfer the recorder from one line to another so that the same study may be made on any line on the system.

Branch of St. Paul R. R. Electrified

Freight on Old Chicago-Evanston Branch of St. Paul Railroad Now Handled Electrically by the Northwestern Elevated Railroad —The Overhead Construction of This Electrification Is of Interesting but Special Design

THE Northwestern Elevated Railroad, Chicago, operates between Evanston and Wilson Avenue, Chicago, on right-of-way leased from the Chicago, Milwaukee & St. Paul Railway. This branch of the St. Paul was originally the Chicago & Lake Superior Railroad, but it was never extended any farther north than Evanston. Passenger service was discontinued on it some years ago, but the steam road has retained a track adjacent to the electrically operated elevated line for the purpose of giving freight service to a number of industries located along the right-of-way, consisting mainly of coal and building material dealers. When it became necessary to elevate the tracks of the Northwestern north of Wilson Avenue, in accord with a city ordinance, the work of necessity included the St. Paul Railroad and the industry spur tracks. With this freight service elevated, the presence of noisy and smoky steam locomotives in the high grade residential section was more than ever undesirable. Consequently, when a new contract was entered into between the elevated and the St. Paul Railroad, which provided facilities for extending service north from Wilson Avenue to the city limits at Howard Street, one of the terms written into the contract by the steam railroad was that this freight service should be handled by the Northwestern Elevated Railroad for the St. Paul at cost. Accordingly, the former company has electrified the track used in this freight service, and this track will now be used for freight service during the non-rush hours. During the rush hours the tracks will be used for elevated passenger trains only, thus enabling the operation of both local and express trains from the downtown loop to Howard Street, the city limits, in both directions.

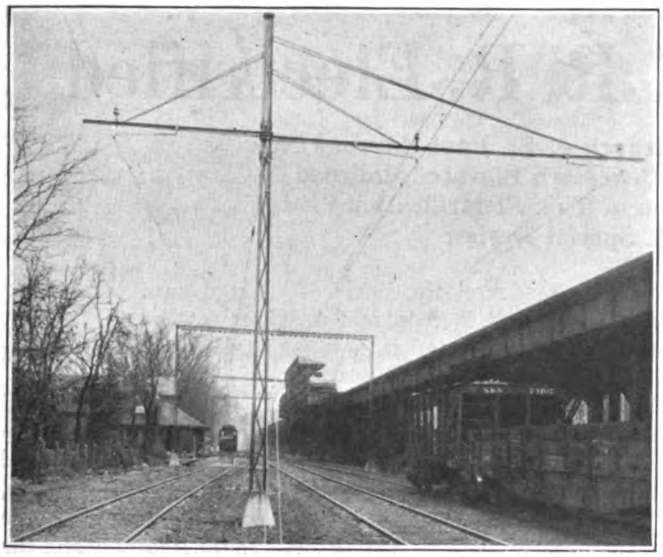
In handling this freight service for the steam road, the elevated company simply acts as the agent of the St. Paul, setting empty cars in the siding and hauling away loaded cars, or vice versa, and having nothing to do with the accounting, billing or any of the details aside from actual transportation. A monthly settlement is made on the basis of a fixed sum per loaded car moved, and the contract provides for the adjustment of this sum at stated intervals to take care of fluctuating costs.



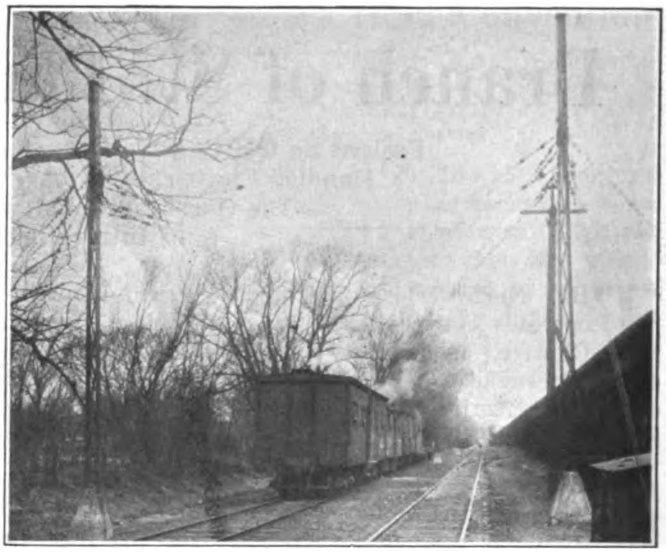
CATENARY OVERHEAD ON CHICAGO ELECTRIFICATION OF ST. PAUL R.R. BRANCH, SHOWING BRIDGE CONSTRUCTION WHERE GUYING WAS IMPOSSIBLE—APPROACH TO ELEVATED TRACK IN BACKGROUND

The steam road leaves the cars in a receiving yard located between Irving Park Avenue and Montrose Avenue and having a capacity for thirty loaded and thirty empty cars. This yard comprises three tracks, one of which is the main line and one the storage track for loaded cars and the other the storage track for empty cars. About fifty cars a day are handled. Cars are taken from and delivered to this yard by the two electric locomotives purchased by the Northwestern for the purpose. Immediately north of the yard the track ascends a 2 per cent grade onto the elevated structure. This freight track then extends north to Howard Avenue. From there to Evanston freight trains will be hauled over the two tracks of the elevated line. One of the most interesting parts of this electrification work was the construction of the overhead. At the present time, the elevated cars are operated between Wilson Avenue and Howard Avenue by means of the overhead trolley, but it is expected that this will be replaced with third rail, as used on the remainder of the system, at an early date. However, on account of clearances, it is impractical to employ a third rail on the track used in the freight service, so that it has been necessary to put up a permanent overhead construction for one track for the distance of 5 miles from Irving Park Boulevard to Howard Avenue. When this track is used during the rush hours in the passenger service it will be necessary to use the overhead trolley. As the cars operating on the Northwestern line must be equipped with trolley poles in order to operate north of Howard Avenue anyway, this will not bring in any new complication.

The overhead construction employed is of the catenary type supported on 6-in. top 35-ft. and 50-ft. Bates expanded steel poles and steel mast arms. The poles set in the ground are all set in concrete 5 ft. deep and spaced for 150-ft. spans. The mast arms sup-



STEEL POLE SUPPORTING OVERHEAD OVER THREE TRACKS, SHOWING CONCRETE FOOTING AND MAST-ARM CONSTRUCTION



METHOD OF DEAD-ENDING HEAVY OVERHEAD—END POLES ARE GUYED TO 2-TON CONCRETE BLOCK ANCHORS BURIED IN THE GROUND

porting the overhead are made up of two pieces of 2¼ x 2¼ x ¼-in. angle irons bolted together back to back with the pole and truss pins and spacing blocks in between the two angles. The messenger supporting the No. 0000 grooved trolley wire is of 7/16-in. Siemens-Martin steel cable. In the storage yard at Irving Park Boulevard it was necessary, on account of lack of space of guy poles adjacent to the "L" structure, to support the overhead over the three tracks on a single line of poles, necessitating the use of 24-ft. mast arms on one side. The overhead equipment was of Westinghouse and Drew manufacture.

Just north of the yard, on account of the long cross-span necessary to provide for three tracks, the heavy weight of the overhead special work at that point, and short guy space, a bridge construction between Bates steel poles was employed. This is shown in an accompanying picture. Over the incline leading up to the elevated track a double trolley was installed in order to provide more current-carrying capacity, for the two locomotives are sometimes coupled together to pull heavy loads up this grade. In this case they may pull as high as 2,000 amp. each for a period of five or six minutes.

METHODS OF SETTING POLES

Several different methods of setting the steel poles was necessary in providing for the different conditions existing along the elevated construction. On the permanent elevation work, the poles were set on the top of the retaining wall or on the concrete curbing on slab construction, and in such setting a special footing was provided for the pole by bolting a piece of channel iron to either side of the pole, as shown in the accompanying drawing. Additional strength at the base of the poles was gained by filling with concrete up even with this top base support. The various methods of setting poles are shown in the accompanying drawing.

An interesting special case of pole setting was that used along the approach to the elevated structure and

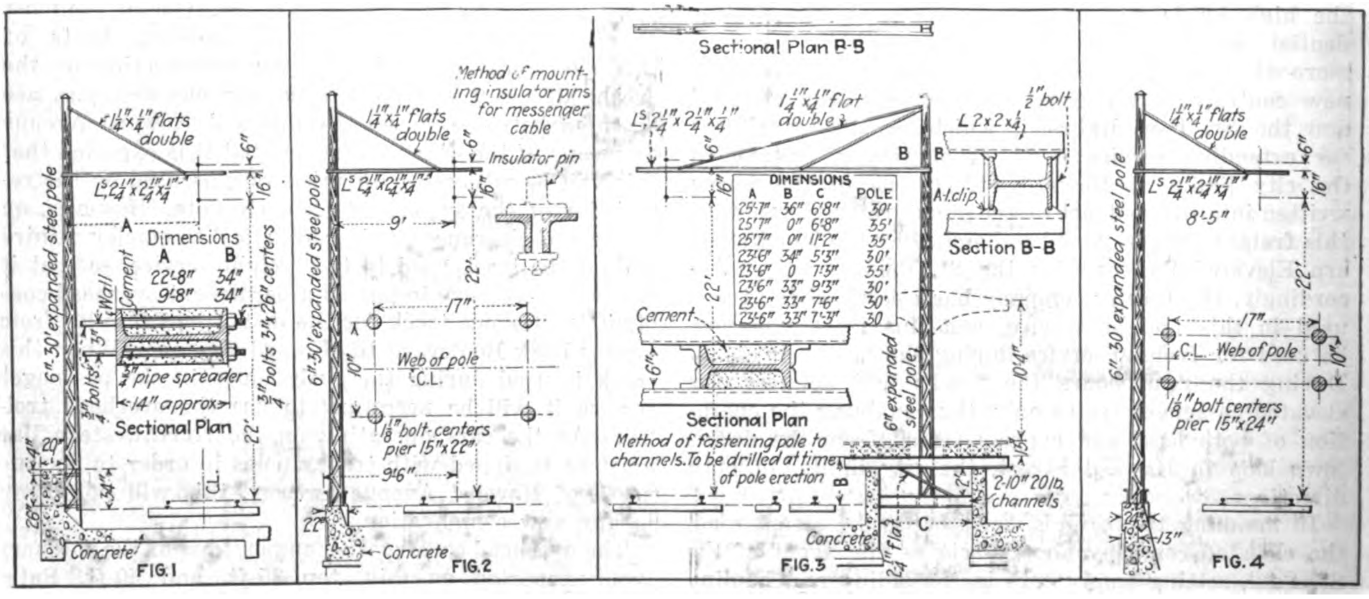

1¼"x¼" flats double
6"
Lˢ 2¼"x2¼"x¼"
16"
A
Dimensions
A B
22'-8" 34"
9'-8" 34"
Wall
Cement
6"-30' expanded steel pole
¾" bolts
3"
¾" pipe spreader
14" approx.
Sectional Plan
¾" bolts 3"x26" centers
22'
20"
4"
34"
26"
C.L.
Concrete
FIG. 1
Method of mounting insulator pins for messenger cable
1¼"x¼" flats double
6"
Insulator pin
Lˢ 2¼"x2¼"x¼"
16"
9'
22'
6"-30' expanded steel pole
17"
10"
Web of pole C.L.
1⅛" bolt centers pier 15"x22"
9'-6"
22"
Concrete
FIG. 2
Sectional Plan B-B
Lˢ 2¼"x2¼"x¼"
1¼"x¼" flat double
6"
16"
B
B
½" bolt
L 2x2x¼
A.I. clip
Section B-B
DIMENSIONS
A B C POLE
25'-7" 36" 6'8" 30'
25'7" 0" 6'8" 35'
25'7" 0" 11'-2" 35'
23'6" 34" 5'3" 30'
23'-6" 0 7'3" 35'
23'6" 33" 9'3" 30'
23'-6" 33" 7'-6" 30'
23'-6" 33" 7'-3" 30
22'
Cement
6"
Sectional Plan
Method of fastening pole to channels. To be drilled at time of pole erection
6" expanded steel pole
10'4"
15"
2'
B
2-10" 20 lb. channels
C
Concrete
2¼" flat
FIG. 3
1¼"x¼" flats double
6"
Lˢ 2¼"x2¼"x¼"
16"
8'-5"
6"-30' expanded steel pole
22'
17"
C.L. Web of pole
10"
1⅛" bolt centers pier 15"x24"
24"
13"
FIG. 4

FIG. 1—METHOD OF SETTING STEEL TROLLEY POLES ON BRIDGES WHERE SIDE GIRDER EXTENDS ABOVE TRACK LEVEL. FIG. 2—METHOD OF MOUNTING POLES ON CURBING WHERE THERE IS A SLAB CONSTRUCTION. FIG. 3.—METHOD OF SETTING POLES IN CENTER OF STATION PLATFORM CONSTRUCTION. FIG. 4—METHOD OF SETTING POLE ON TOP OF CONCRETE RETAINING WALL FOR FILLED-IN EARTH ELEVATION

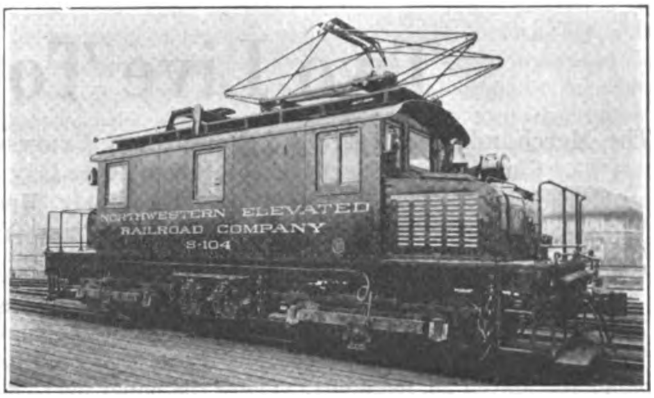
at certain other points. Here the poles were set in the ground adjacent to the concrete retaining wall, making necessary a 50-ft. pole. These 50-ft. poles were made up of three standard 25-ft. steel poles, two of which form the base, with the third as the upper part and supported by fastening to the top of the bottom sections. The two bottom poles were erected and riveted together side to side, with six rivets. The upper section was then held in place by means of two plates overlapping the top and bottom poles and riveted thereto with six rivets in each plate.

ELECTRIC LOCOMOTIVES USED

For the sake of standardization, the two 50-ton Westinghouse 600-volt direct-current locomotives purchased by the Northwestern for handling this freight service were equipped with the same size wheels, the same motors and the same gear ratio as that used on the latest type of steel cars purchased for passenger service on the elevated lines. Each locomotive is equipped with four Westinghouse 567-R-1 motors. The wheels are 34 in. in diameter and the gear ratio 17 to 60.

These motors are of the field control type, developing 165 hp. each on one-hour rating. The locomotives are arranged for multiple-unit control so that they may be coupled together for pulling a train as long as twenty-five cars up the 2 per cent grade approaching the elevated structure. They are equipped with Economy watt-hour meters. There are three running points provided in the control, providing three operating speeds. These are derived by connecting all four motors in series, two motors in series and two in parallel, and four motors in parallel. The motorman notches up the throttle-type controller through sixteen points to the full series position, then brings the controller back and throws a change-over lever which provides for the parallel running points.

The brake equipment is of the Westinghouse 14 E. L. locomotive automatic type with air supplied by a Westinghouse Type D-3-F 35-ft. compressor designed for continuous duty. All equipment is mounted inside the cab. The trucks are of Baldwin Locomotive Company manufacture.



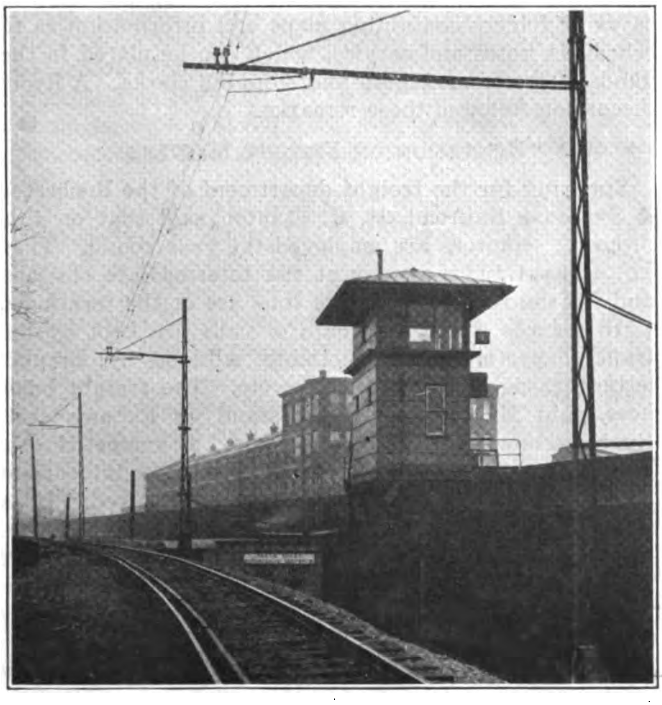
ONE OF THE ELECTRIC LOCOMOTIVES USED BY NORTHWESTERN "L" TO HANDLE ST. PAUL R.R. FREIGHT

Pneumatic Wrenches Used for Tightening Track Bolts

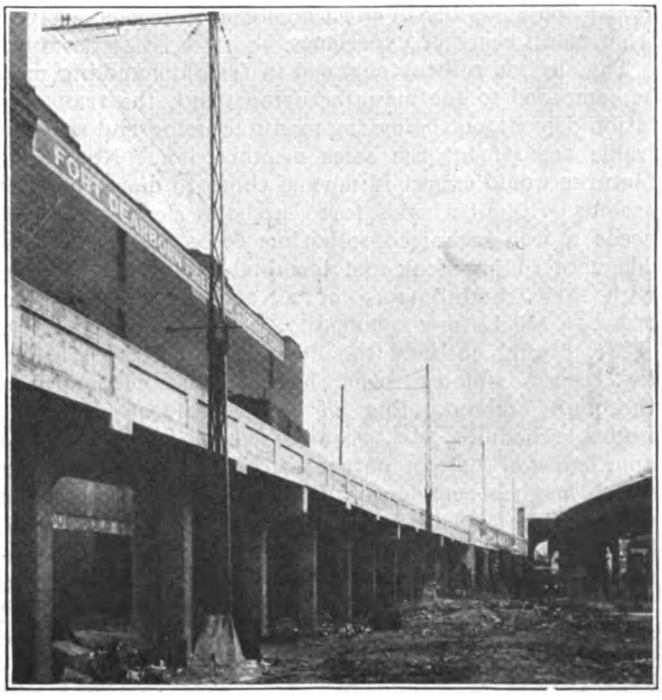
IN SEVERAL recent operations of laying rail, the Lehigh Valley Railroad has used pneumatic wrenches for running up and tightening the track bolts. As this was its first attempt the organization worked out for the operation was somewhat of a makeshift character.

In one instance an air compressor was pushed along by hand and four pneumatic wrenches were attached to it by air hose. This arrangement covered two joints at one time. In another case, a motor car was attached to the compressor and but two wrenches were operated. The time for running up a joint and moving to the next averaged about thirty seconds per joint.

The men released by the machine were placed at work on the old rail preparing it for loading.



DOUBLE TROLLEY WAS INSTALLED OVER THE GRADE UP TO THE ELEVATED TRACK—SIMPLE SINGLE-TRACK POLE AND MAST-ARM CONSTRUCTION



METHOD OF ERECTING OVERHEAD POLES, MADE UP OF THREE LENGTHS RIVETED TOGETHER, BESIDE THE ELEVATED STRUCTURE

Two Live Topics Discussed

The Merchandising of Trolley Freight and Express Service and the Latest Facts Regarding the One-Man Car Were Subjects of the Recent One-Day Conference of the New York Electric Railway Association's Quarterly Meeting, Which Was Held at the Biltmore in New York City on March 18

THE twenty-fourth quarterly meeting of the New York Electric Railway Association was held in New York City on March 18. A part of the conference was the subject of an article in the issue of this paper for March 26, page 601. There the paper by L. R. Brown, New York State Railways, was abstracted and the discussion which it provoked was summarized. Below are reports of the informal discussion of the freight and express business of electric railways and of the safety car.

Freight Department Has Great Opportunity to Help Increase Net Income

THE discussion on electric freight business was opened by T. H. Stoffel, railway department Westinghouse Electric & Manufacturing Company. He said that railway men do not generally realize the importance of intelligent and well-directed freight solicitation. While the securing of freight tonnage is properly the principal function of the traffic department, often this department is handicapped and subordinated to the operating or transportation department. It is relegated to the position of a clerical division, with activities largely confined to compiling tariffs, quoting rates, adjusting claims, etc. The head of the traffic department is entitled to rank with the chief transportation officer and should be vested with complete responsibility for the results of freight operation. He should have a voice in the arrangement of freight schedules, distribution of equipment, etc., and should enjoy the full co-operation of the transportation department. This is a plan of organization generally in effect on steam railroads, evolved from many years of experience.

The electric railway engaged in freight handling may be compared to the manufacturing plant, the transportation department being the manufacturing end and the traffic department the sales organization. No manufacturer would expect in normal times to dispose of his product without a sales force, and the electric railway needs a well-organized soliciting force, backed up by adequate rolling-stock and terminal facilities, together with strict maintenance of advertised schedules, in order to sell its one commodity, transportation service.

Mr. Stoffel outlined the desirable characteristics in the freight solicitor, who, he said, in addition to a thorough understanding of the classification, rates, routes, schedules, etc., requires considerable tact and knowledge of human nature, coupled with personality which inspires confidence. He will be called upon from time to time to solve many knotty transportation problems, smoothe over complaints, inspect damaged shipment, arrange payment of claims, and generally satisfy the needs of patrons. He must also educate shippers as to matters in connection with forwarding goods. The freight solicitor who can gain and hold a shipper's confidence and assist him in solving his problems will receive preference in the routing of shipments.

As the purchaser or consignee, as a general rule, pays the freight and controls the routing, Mr. Stoffel said that it is very necessary that he be induced to include a desired routing on his order for goods. This requires personal effort, as the practice of securing routing requests on blanks provided for the purpose by the railway and filing them with the shipper does not in general bring the desired result. It should be the freight solicitor's duty fully to acquaint himself with the tonnage moving to and from his territory at all times, and be able to anticipate shipments of seasonable goods far enough in advance to make early solicitation and to have routing by way of his line based on orders sent in. The representative at the shipping point should also be kept fully informed. Local agents along the line can also assist in this work by transmitting to the traffic department full particulars regarding shipping information which they pick up from time to time.

Among other ways mentioned by Mr. Stoffel in which freight traffic can be developed were co-operation with civic bodies interested in the advancement of their communities with a view to securing new industries for the towns and locating them near electric railway lines, finding new markets for established industries, assisting industries in locating and securing raw materials, and even creating a fairly new industry for the territory. As an example, through the traffic department of one electric railway, a tomato raising and canning industry was located along its lines, with the result that it enjoyed an excellent business hauling tomatoes to the plant and from it to distributing centers.

In conclusion, Mr. Stoffel urged the importance of using newspaper and other advertising, particularly cards or folders containing maps and information as to schedules, rates and service, which can be placed in the hands of traffic managers and shipping clerks. A lively discussion followed these remarks.

DISCUSSION ON FREIGHT MATTERS

Speaking for the freight department of the Rochester & Syracuse Railroad, H. C. Stanton said that on this property solicitors are employed the year round. They call at least twice a year at the intermediate stations and for the remainder of the time are at the terminals. Card records giving full data of calls are kept by the traffic department. Advertising is done by circular letters, cards in waiting rooms, etc. The freight business, said Mr. Stanton, must stand on its own feet. Business now needs to be gone after, as competition is keen and shippers are watching rates. As interurban rates are high, good salesmanship is required. It is important that every promise made be kept scrupulously. At the suggestion of H. H. Norris, ELECTRIC RAILWAY JOURNAL, who spoke of the advertising value of attractive freight terminals, Mr. Stanton described the new terminal at Rochester.

The necessity for getting new business was urged by W. J. Harvie and W. J. Lee, Auburn & Syracuse Electric Railroad, who reinforced Mr. Stanton's statements as to the importance of personal solicitation, say three to five times a year, to advertise the superior quality of the service and thus to offset the effect of the slightly higher rates. Another speaker suggested applying to the traffic business the principles followed by the manufacturers in knowing more about their customers' business in some particulars than the customers themselves, and in studying the ways in which the customers can be served. Further, there must be co-operation between the freight solicitors and the operating management so that the former will know what kinds of business are profitable and should be sought.

T. R. Langan, Westinghouse Electric & Manufacturing Company, said that if the electric railway people were as enthusiastic as the truck salesmen, and believed in themselves as thoroughly, they would get better results. He suggested as timely questions those relating to the obstacles which are met in selling railway freight service and to the extent to which electric railway traffic men are co-operating in the freight business. Other questions relate to the places in which the freight business can best be developed.

TRUCK COMPETITION NOT SERIOUS

As to the matter of truck competition, Mr. Stoffel said that this is not as serious as some seem to think. The chief difficulty with truck operators is to get them to keep accurate accounts of expenses. Most of them are living on the depreciation of their trucks. Trucks cannot compete with electric railways on runs longer than 20 to 25 miles. Some industrial concerns or merchants make their own deliveries up to 30 miles, but they would not find this profitable if they allowed for overhead expense. A large number of truck operators in business two years ago have now given up. Mr. Stoffel expressed the belief that electric railway men make too much of the truck competition, which he did not consider permanent. In answer to a question from Mr. Harvie as to the desirability of reducing electric railway freight rates to compete with steam railroad and truck rates, Mr. Stoffel said that this should not be done. The same basis of rates as that used by the steam roads should be used. Trucks cannot operate at less than American Railway Express Company rates. The superiority of electric railway service with respect to the effect on the shipment should be made much of. For example, milk and live stock are delivered in much better condition and the service excels on perishable products.

A. J. Manson, also of the Westinghouse company, said that success in selling electric railway freight service is largely a matter of analysis of the sales possibilities on a particular property. Moreover, steam railroads are going to become more congested in the future and they will find local business less profitable to handle as time goes on.

H. C. Page, general manager Worcester (Mass.) Consolidated Street Railway, said that his company is doing considerable freight business, which is an excellent business to develop, because once a customer is secured, he seldom gives up the service. This service is quicker and more reliable; there is no reason for fearing motor truck competition, because the electric railways will get their legitimate business in the long run and the limit of economical radius for truck service is less than 20 miles. Truck operators are not as enthusiastic as they were. The trouble with the electric railways is to get the equipment to handle the business. Direct truck service between New York and Worcester was inaugurated some time ago, but has not proved successful. As an example of electric railway freight service, Mr. Page cited the motor and trailer night train operated between Boston and Springfield. His company furnishes a two-man crew between Worcester and Springfield. The business is profitable. Freight cars are dispatched carefully just like passenger cars and steam road rates are charged. In conclusion, he said that his company would not think of giving up its freight business.

The discussion on freight and express traffic was closed with a number of short suggestions. D. E. Crouse, Rochester & Syracuse Railroad, said that electric railways should take a hint from the manufacturers and furnish their freight solicitors with "kinks" which would make the service attractive. H. N. Ransom, Westinghouse Electric & Manufacturing Company, asked as to the use of containers moved on flat cars, but this point was not discussed. Frank Hickey, Rochester & Syracuse Electric Railroad, urged that motor trucks be put under public service commissions to force them to carry their share of the road maintenance cost, etc. Mr. Stoffel said that motor trucks are going to be suitably taxed. Already substantial annual and mileage taxes are being levied and this will help to solve the problem of competition. Chairman Cherry agreed that rates should not be lowered in competition with truck and steam railroad service. The whole thing sums up thus, he said: "Good service deserves good rates."

One-Man Car Operation

A DISCUSSION of the advantages and disadvantages of one-man car operation was taken up immediately after luncheon. R. E. McDougall, manager traction lines New York & Harlem Railroad, told of his experience in operating one-man cars on the Eighty-sixth Street crosstown line in New York. This operation was begun as an experiment last July with double-truck cars having folding doors and steps. The only change made for their use in one-man operation was to lock the back door.

The crosstown line is approximately 1½ miles long and this service is now taken care of by ten cars during the off-peak period, with fourteen to sixteen cars during the rush hours. The cars are 37 ft. long, weigh approximately 15 tons and seat thirty-six passengers. The operation has been successful and the operators have had no trouble in handling the passengers. A small Johnson fare box is used and this is carried from end to end by the operator whenever he changes his operating end. This line is carrying approximately 14,000 revenue passengers and receives 4,000 transfers per day. The service is taken care of by operating a 3.7-minute headway during off-peak periods and a two-minute headway during rush hours. The scheduled speed is 7.7 m.p.h. and the cars are operating approximately 1,300 miles per day.

A noteworthy result of this operation is that the earnings have increased approximately 85 cents per car-hour and from 9 to 11 cents per car-mile.

Mr. McDougall said that there had been no increase in accidents other than some due to vehicular traffic, and this he believes was accounted for by the present use of twenty-eight city buses that were not in operation the previous year, with which the present operation was compared. Later, in answer to a question as to how he accounted for the increase in earnings, Mr. McDougall said that he believed some of this was due to people changing from bus riding to riding in the cars, as there had been a falling off in passengers carried by the buses. The motormen operating these cars receive 5 cents per hour more than those operating two-man cars. No breaking-in period was used at the time of starting the operation. A notice was posted and verbal instructions given, but otherwise no additional instructions were given the motormen.

W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, told of the experiences that his company has had in operating Birney safety cars during the past year. He said that no subject is of any more active interest at present than that of reducing platform expense and of realizing economies that result from safety-car service. The service in Brooklyn is quite varied. Operation of safety cars at the present time is over bridges which have a considerable length, and in suburban service where the stops per car-mile are comparatively infrequent. Also the cars are operated through a more-or-less congested district.

At the introduction of safety car operation, the service was given no particular publicity, and so far no serious trouble has been experienced from the riding public. The crews of these cars receive 5 cents per hour more than the regular rates, which are 57 cents to 67 cents per hour.

Mr. Gove said that at present the Brooklyn surface lines are operating approximately 2,000 cars daily and he believes that there is a field in Brooklyn for the operation of at least 1,000 safety cars at the present time.

DESIRE FOR LARGER CAR DISCUSSED

In regard to various criticisms which are being made of the Birney type of safety car, which would seem to indicate a desire for a larger and heavier car, Mr. Gove said the more quickly the operators divorce themselves from the experiences which they have had with other types of cars the better it will be for all concerned. The only excuse for adding more weight is to increase the strength, and while at present truck drivers in Brooklyn seem to feel that they can take somewhat more liberties with the light cars than they would attempt with the heavier ones, still Mr. Gove said that he had found that while accidents are more frequent the repairs can be more easily taken care of. The type of construction permits of the cars being put back into shape with less cost than would be the case with heavier type of construction. As a result of the one year's experience Mr. Gove felt that the maintenance cost which had been occasioned by accidents was not particularly high with the safety car.

At the present time the Brooklyn company is contemplating changing over 200 double-truck cars for one-man operation. These cars are provided with what is called a "one-third vestibule" and changes will have to be made in order to provide folding doors and steps. It is the intention to use all the standard safety devices in equipping these cars.

In answer to a question by J. K. Choate, vice-president J. G. White Management Corporation, Mr. Gove said that, comparing the probable life of the Birney car with the life of standard cars, he considered the life of the New York Municipal's subway car to be approximately thirty-three years and that of the safety car to be about twenty years. In regard to over-motoring safety cars to reduce maintenance cost, Mr. Gove said that he did not recommend this practice, but that care should be taken not to overload the motors by using safety cars to push snow out of the way. The experience in Brooklyn in the winter of 1919-1920 was somewhat discouraging during the first snowstorm, as due to lack of knowledge on the part of the transportation department quite a lot of safety car equipment was burned up. Profiting by this experience, the safety cars were run in as rapidly as possible during the late snowstorm and no attempt was made to operate them through snow.

CHICAGO CAR REFERRED TO

Mr. Choate referred to the opinions being voiced by some operating men that the single truck is a mistake for safety-car operation, as this type of truck rides badly over rough track in pavements and there is sure to be nosing on any track. Mr. Choate said that in Chicago they were now building a car for trial with maximum-traction trucks and of a slightly larger capacity. He felt, he said, that one-man cars have led to more overloading than has been experienced with any other type of car. He also said that he did not believe that the present light-weight cars would last twenty years and that a somewhat stronger construction was desirable. In reply Mr. Gove said that it does not necessarily follow that because a car is light its depreciation is rapid. As maintenance is probably the most vital factor, if a car was kept up in proper condition its life will be increased materially.

As to the use of a larger car, Mr. Gove said that he does not consider the safety car other than as a development of a unit; there is a wide field for the present type of car and just as wide a field for a double-truck car or a larger car. It would, however, be a serious mistake to have too many designs of safety car. No doubt improvements in car construction and equipment can be made in the present car, and these of course should be incorporated. In regard to brake rigging, he considers the present design safe and especially so when used with steel wheels as in Brooklyn.

In reply to a question as to the effect of over-motoring the cars and the desirability of doing this with any new equipment, A. J. Manson, Westinghouse Electric & Manufacturing Company, said that motors operating at 100 per cent of their full load rating would have a certain temperature rise. If the motors were operated at 80 per cent of their rating the temperature rise would be nearly as great, so that the life of the windings, which necessarily depend upon the temperature rise to which they are subjected, would not be materially longer. He said, however, that under overloading the conditions were somewhat different, as if the equipment was operated at 110 per cent of the full load rating the overheating would no doubt do considerable damage.

D. W. Burley, superintendent of transportation Binghamton Railways, said that his company had converted some cars for one-man operation. These cars have a seating capacity of twenty-eight and carry loads of considerably over a hundred during rush hours. These cars are used in service with regular two-man cars and their introduction has not slowed up operation in any respect. The trucks have a long wheelbase and ride very easily. Originally iron wheels were used, but the railway is now changing to steel wheels and finds these much better as there is less chipping of flanges.

In reply to a question as to experience of railways in operating over railroad crossings and the precautions that are necessary, Charles Brooks of the Poughkeepsie & Wappingers Falls Railway said that this company's cars operate over two such crossings. The procedure is for the operator to stop his car and go to the crossing so as to make certain that no train was approaching, then return to the car and cross as soon as possible. A trolley guard is used over such railroad crossings.

F. A. Stratton, president Peekskill Lighting & Railroad Company, said that the light cars save power as well as platform expense, but that his experience showed them not to be adapted to snow conditions. A 7-cent fare is in force in Peekskill and the cars carry large loads over very severe grades. They keep up to schedule and operate well.

H. C. Page, general manager Worcester Consolidated Street Railway, said that ten Birney-type safety cars and one converted one-man car are operating in Worcester and that the operators seem to like the converted type even better than the Birney. The car has a large standing capacity, due to its longitudinal seating arrangement, and it is earning about 10 cents per car-mile more than the standard Birney car.

Hazard of Faulty Switchboard Construction*

Certain Factors Must Be Considered if Switching Apparatus in the Modern Power Plant Is to Be Installed with Due Regard to the Safety Feature

By Roscoe M. Bert

Electrical Superintendent Rockford Electric Company, Rockford, Ill.

THERE are many power plants in operation all over the country, with switchboards for 2,300 and 4,000-volt systems, which are entirely inadequate properly to perform the true function of a switchboard in emergency. There is now available considerable information as to what makes possible a reasonably safe switchboard under all conditions of short-circuited cables and busbars. To obtain proper safety the following points must be carefully considered: (1) Ultimate capacity of generators installed. (2) Reactance of generators when all are operated in parallel. (3) Proper location of external reactance to limit short-circuit currents. (4) Selection of an oil switch which will rupture the circuit under the worst possible conditions. (5) Proper arrangement of the apparatus to reduce life and fire hazards.

In many cases the point has been overlooked that any switch connected to a main busbar should have rupturing capacity equal to the total short-circuited capacity of all generators in operation, or at least should be protected by reactors to within the limit of the rupturing capacity of the switch, and, of course, protected by dependable relays.

In the past few years many stations of comparatively small capacity have made additions of large turbine generators and connected them to the existing switch equipment, and in many cases have "gotten by" with no serious results, but in others serious fires and accidents have occurred. As long as service is satisfactory and until an accident occurs we do not realize the dangers that exist. Recently this was very forcibly brought to my attention at a property in Indiana. In this instance an oil switch short circuited and blew up, killing two men and destroying by fire half the bus structure, a quantity of cable and damaging several motor-generator sets. Property damages amounted to approximately $20,000. Had the repair man and operator realized the danger and had sufficient apprehension as to possible results, the loss of life and most of the property damage could have been avoided.

As a result of this accident our engineers have decided completely to rebuild the switching equipment of the Rockford property and all others which are in an unsafe condition. All switches and busbars will be placed out of doors, using weatherproof apparatus completely. This has been done for some years for high-voltage equipment for 13,000 volts and above, so why not for 2,300 and 4,000-volt systems? The details of this scheme have not been fully worked out, but we have consulted manufacturers' engineers and they think it feasible.

Frequently switchrooms are partitioned off from all other parts of the power house, and are seldom seen by the operators. I would advise that openings be provided if possible that any incipient fire could be promptly seen by the station men. These openings should serve a further purpose, that is to allow men to escape in case a fire starts while they are working on the apparatus in these compartments.

Operators should be cautioned regarding accuracy in synchronizing of generators, as this is very severe service on switches unless done accurately. To improve this accuracy, I would recommend the use of a synchroscope with a very large dial and the cautioning of station men to take plenty of time in putting machines on the lines.

Bulletin on Employment of Women as Conductors

THE success of the employment of women street car conductors or ticket agents in Boston, Chicago, Detroit and Kansas City is described in a bulletin just issued by the Women's Bureau of the United States Department of Labor.

Conditions for street car conductors were not ideal, according to this report, but no reason was found to prove that the work of a street car conductor was not fit for women. Neither the history of the employment of women on street cars nor the many disputes which arose over their employment were sufficient reasons for the final decision of the men's union that street car conductor's work was "unfit for women."

The discharge of many women ticket agents as well as conductors of the street railways of New York City in 1919 was the reason for the making of this study, as the Department of Labor did not consider these companies justified in the claims that they could not employ women and adhere to laws which had been passed regulating their hours of work. In conclusion the report states, "records from Chicago and Boston show that with the eight-hour day and six-day week, without night work, and with a wage far superior to that paid women in many other occupations, the woman ticket agent and collector is an accepted and permanent fact in two large cities. The fact that these conditions are far better than those prescribed by law in the same communities shows that some other contributory factor must be present when women are dismissed from this work because of the requirement for them of reasonable hours of work."

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*Abstract of paper presented before the Illinois Electric Railway Association in Chicago, March 16, 1921.

Electric Locomotives for the Austrian State Railways

Four Types of 15,000-Volt, Single-Phase Locomotives Have Been Designed to Meet the Various Conditions of Traffic Requirements, Topography and Track Limitations

By Arthur Palme

THE reasons which prompted the Austrian State Railways long before the war to electrify its roads hold true in a far greater measure for the new republic of Austria. The former Austrian monarchy was rich in coal, so that electrification of its railways was based almost exclusively upon the relative cost comparison between steam and electric traction. Today, as the republic can supply only 16 per cent of its coal requirements, it is under the necessity of electrifying all of its roads, thereby to maintain its railroad traffic and industries more nearly regardless of the high price of imported coal and the irregularity of its supply.

In the bill passed in July, 1920, the electrification of 40 per cent of all the main roads of the republic was specified. The lines included in this bill were enumerated in an article in the March 5 issue of the Electric Railway Journal by E. C. Zehme. Work has already begun on one of the most important of these lines, the Arlberg line from Innsbruck to the Swiss frontier near Bregenz.

Austria shares fully the general middle European railroad dilemma; that is, the doubt as to the most favorable system to adopt. Extensive studies of a general character and of the specially required best solution, however, led finally to the selection of the alternating-current, single-phase system with the low frequency of 16⅔ cycles per second at an overhead wire tension of 15,000 volts. The possibility of using three-phase current was not seriously considered on account of the much higher investment cost. One of the main reasons why high-voltage direct current has been eliminated is the lack of European experience with this system, and the necessity for extensive developmental and experimental work on the part of the Austrian and German electrical concerns in connection with this system, whereas all details for the alternating-current system had been developed and well tried.

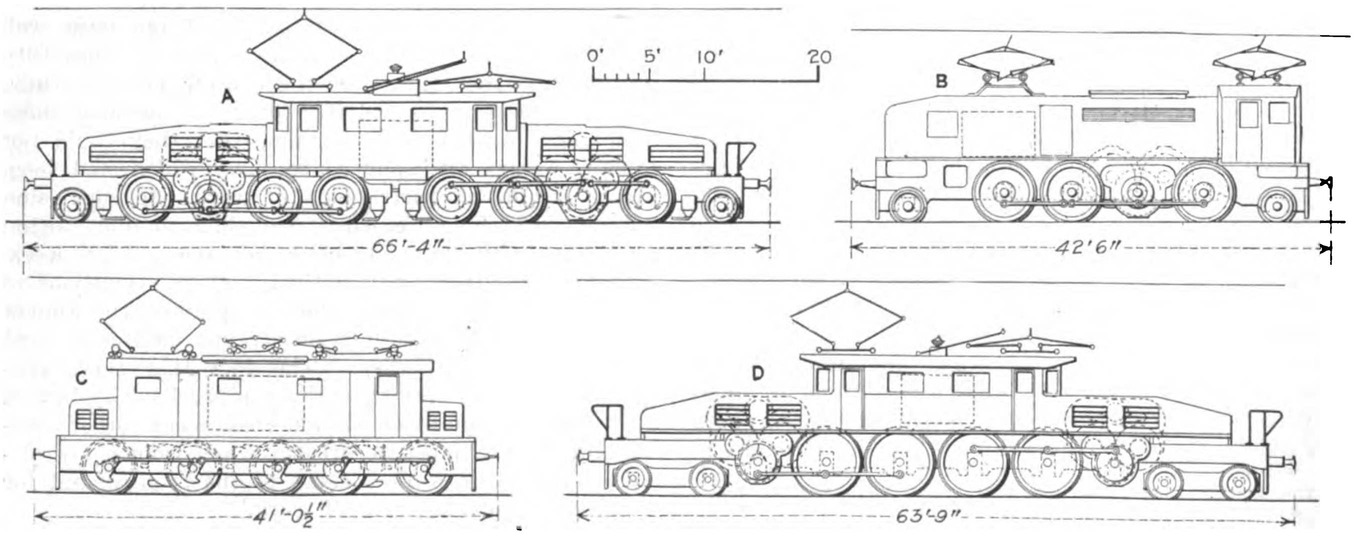
The topographical character of the planned lines is diversified. While there are typical mountain stretches with grades as steep as 3.14 per cent and unfavorable right-of-way, there are also long stretches of down grades so straight that speeds up to nearly 60 m.p.h. are being reached now with steam locomotives. In addition, very different traffic requirements exist on the various lines. For that reason four types of electric locomotives have been ordered to take care efficiently of the different kinds of service required by fast and slow passenger traffic and freight service. In order not to overload the present rails and some of the old bridges a limit of 16 tons axle pressure and a locomotive weight of not exceeding 2.3 tons per foot of over-all length have been established. All locomotives are built safely to round a curve of 500 ft. minimum radius. They will all be equipped with alternating-current series commutator motors, operating on a voltage reduced from 15,000 to 400-1,300 volts, transmitting their power to the drivers directly by gears or by gears through a jack-shaft to coupling rods. All locomotives will have the automatic vacuum braking system, customary in Austria.

The following types of engines have been standardized and ordered:

DATA ON LOCOMOTIVES FOR AUSTRIAN STATE RAILWAYS

Type	Weight, Tons	Length, Ft.	Horsepower		Dia. of Drivers, In.	Gear Ratio	Motor Voltage	Transformer		Capacity
			Continuous	One-Hour Rating				Rating, Kva.	Voltage	
1C + C1	127.5	66.3	2,000	2,460	53	1:3.2	575	2,000	15,000/1,240	396 tons at 31 m.p.h. on 2.64% grade 330 tons at 28 m.p.h. on 3.14% grade Maximum speed—40 m.p.h.
1C1	76	42.5	780	1,100	63.5	1:4.0	520	800	15,000/1,050	330 tons at 25 m.p.h. on 1.4% grade 220 tons at 21.5 m.p.h. on 2.5% grade Maximum speed—40 m.p.h.
E	80	41.0	.....	.....	57	1:6.3	...	850	15,000/440	1,100 tons at 18.5 m.p.h. on 0.8% grade Maximum speed—31 m.p.h.
2BB2	108	63.7	....*	.....	....	.....	..*	....*	15,000/*	495 tons at 18.5 m.p.h. on 1.5% grade 638 tons at 25 m.p.h. on 1.0% grade 715 tons at 50 m.p.h. on level Maximum speed—62 m.p.h.

* Electrical data not yet fully determined.



SIMPLIFIED ELEVATIONS OF THE FOUR TYPES OF AUSTRIAN LOCOMOTIVES

1. Express locomotive for mountain passenger service, class 1C + C1.
2. Passenger and freight locomotive for medium mountain road service and light freight, class 1B1.
3. Heavy freight traffic locomotive for level and mountain roads, class E.
4. Heavy express passenger locomotive for level and medium mountain service, class 2BB2.

The principal characteristics and outstanding features of these locomotives are shown in the accompanying table and illustrations. In general the same characteristic type of construction prevails, that is side rods driven from a jackshaft to which the motors are geared. However, the mountain freight type of locomotive differs from the other three designs in the detail that the motors are geared directly to the wheels, while all five axles are rods coupled. The 1C + C1 type will be used for pulling through trains over the steep grades of the Arlberg road.

In order to permit starting of electric operation before all roads are completely electrified, a number of battery-car trains are being built, each consisting of the battery car in the middle of the train and two passenger cars on each end. Two of the passenger coaches are trailers and two are motor cars which have a total motor output of 190 hp. at a normal speed of 22 m.p.h.

The batteries to be used weigh 20 tons and have a capacity of 222 amp.-hr. at 520 volts. The capacity of such a train, which is for auxiliary purposes and short distance only, will be 176 seated and 130 standing passengers.

Wisconsin Association Meets

Safety Car Operation and Construction, Street Railway Rates and the Use of Weekly Passes Are the Main Topics Discussed by Railway Members

IN JOINT meeting with the Wisconsin Gas Association, the Wisconsin Electrical Association met in its thirteenth annual convention on the afternoon of March 23. This session of the association was presided over by William C. Lounsbury, Superior, Wis., president of the electrical association, and it was occupied with broad utility matters. The meeting was addressed by Charles B. Scott, member of the national safety committee of the National Electric Light Association and general manager Bureau of Safety, Chicago, on some of the hazards of the electrical business and how to guard against them. A report on the work of the Wisconsin Public Utilities Bureau, organized during the past year for the purpose of spreading information about the public utilities to the public, was made by Frantz Herwig, director. R. V. Prather, secretary of the gas, electric and electric railway associations of Illinois and of the Great Lakes Division of N. E. L. A., read a paper setting forth in very able manner the various aspects of the need for associations of public utility companies, the purposes of such organizations and the obligations of the companies to them.

A banquet at the Pfister Hotel on the evening of March 23 concluded the joint convention. N. J. Whelan acted as toastmaster of this function and Edgar A. Guest was the speaker of the evening. A good deal of entertainment was afforded to the members by the distribution of several articles as gifts to different members of the association.

The Wisconsin Electrical Association held a separate meeting on March 24, at which time the president's annual address was read and various committees made their reports. Speaking of the railway situation, President Lounsbury said: "The street railway situation is not nearly as discouraging as it has been for the past few years. In many places it is indeed dark. The truck, the pleasure car and the former rapid expansion of lines increasing the long haul, together with the extremely high operating expenses, have been disastrous in their consequences, but from the confusion comes a realization of the importance of the street car and a better public appreciation of its worth to the community."

For the steam road crossing committee, C. R. Phenicie, Wisconsin Public Service Company, reported that the Wisconsin Railroad Commission had done an extensive work in classifying all crossings and tabulating them with the clearance, grade, angle, protective devices used, etc., all of which was considered to be of little value to the electric railway. He said that an effort had been made to co-operate with the steam railway officials who had this matter up before the commission, but the latter had refused to co-operate. The committee advised the association to recommend to the commission that a whistle post be installed on the approach of all steam line crossings with electric railways, and that trains be required to slow down to 25 miles per hour for the crossing. In discussing this report, which was adopted by the association, Dudley Montgomery brought out that it is the practice on his property in Madison, Wis., for the motorman to flag his own car in all cases, two-man as well as one-man cars. He does this by getting off his car and running across the tracks to make observation.

Several brief papers on one-man car operation were then read by Messrs. Arnold, Howard, Montgomery and Phenicie. Some of these appear in abstract in this issue and the others will be published later. In the discussion which followed, Mr. Montgomery took issue with the question raised by one of the speakers as to the use of the name "safety" in connection with the small one-man car. He said that the car had well earned its name, for the number of accidents had been very greatly reduced as compared with any other type of car. He said also that many companies had always wanted to use one-man operation but were not able to do so until the safety devices were invented.

H. A. Mullett, Milwaukee, spoke briefly of the use of safety cars in Racine and Kenosha, Wis. He pointed out that the design of these cars had included double flooring, side sheathing and head lining, steel wheels instead of cast, hot-air heaters instead of electric, and spring-cushion seats. He said that the standard width door, 30 in., had been used thus far, but the company had some feeling that a wider door would be better. He spoke also of the present consideration given to the air system to prevent freezing, and said that not a single case had developed during the past winter. Since the installation of safety cars in these two cities there has been such a falling off in the general business handled by the company, that Mr. Mullett said it was impossible to make any comparison as to the savings, increase in business developed by the more frequent headway, etc.

He spoke of the weekly pass which has been in use in Racine for two years and was recently adopted in Kenosha as well. The principal advantage claimed for this unlimited pass is that it promotes the habit of riding and encourages riding, particularly during the off season. During the winter of 1920 the company sold about 2,000 passes per week, the revenue from which amounted to about 15 per cent of the total. During the summer, when the amount of traffic always falls off in Racine, the number of passes sold averaged about 1,300 per week, which accounts for 10 or 11 per cent of the total revenue. For the first three months of this year 2,200 passes per week have been sold, approximately 20 per cent of the total revenue coming from this source. Mr. Mullett said that these passes are very popular in Racine. They are sold for 98 cents to the trainmen, who distribute them to the riders for $1 each. He said it has been impossible to determine definitely how much increase in riding has been fostered by the use of these passes, but mentioned the fact that many downtown restaurants had protested because a good many of their customers were now going home to lunch.

W. H. Sawyer, president East St. Louis & Suburban Railway, made a plea for companies to hold to the standard design of safety car, because of the many advantages accruing from the reality of standardization. He ridiculed the contention of "local conditions" often used to support an argument for a different design.

Mr. Sawyer then presented a paper on street railway tariffs, in which he reviewed the study and findings of the committee on fares of the American Electric Railway Association and gave the result of some recent investigation on his part as to the results obtained from the inauguration of 10-cent fares in various cities. His principal conclusion was that higher fares do produce increased revenue, and that where the rate of fare must be above 5 cents, a 10-cent cash fare with reduced ticket rates is the best form of tariff. His paper will appear in abstract in a later issue.

The following officers were elected to conduct the affairs of the association for the ensuing year:

President, J. P. Pulliam, vice-president in charge of operation Wisconsin Public Service Company, Milwaukee, Wis.; first vice-president, Harold L. Geisse, Milwaukee; second vice-president, P. D. Kline, vice-president Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.; third vice-president, Harry R. Ellis, vice-president and general manager Eastern Wisconsin Electric Company, Sheboygan, Wis., and secretary, W. M. Chester, 1408 First National Bank Building, Milwaukee, Wis., assistant to Mr. Pulliam in the Wisconsin Public Service Company.

Why Not the One-Man Car?

BY B. W. ARNOLD

Manager Eastern Wisconsin Electric Company, Oshkosh, Wis.

THE name "safety car" as applied to this new type of car operated by one man I feel is an error, because there is no such thing as a safety car any more than there is a safety shot gun or safety revolver. Either is safe if properly handled, but neither is safe if improperly handled. Accidents will always continue to occur as long as they are in use. Can you imagine the feeling of some poor chap who has been unfortunate enough to be struck by a car and knocked to the side of the road and, while lying there waiting for the ambulance, he sees in large letters on the front of the car the words, "safety car"?

I am heartily in accord with the different safety devices which have been installed on this new car. The feature of the emergency action from letting go of the controller handle and the handling of doors and steps by engineering valve are both a distinct development in the art of car control and of great benefit in preventing accidents. But to operate all of these safety devices we again revert to the human element, and that, as we all know, is subject to failure as are mechanical devices. I therefore see no need of any departure from the old honored name of "street car" when this new car is placed in operation in any community.

Some opposition has been encountered in some parts of the country to the operation of street cars with one man, but I feel this is simply another problem for the local management to work out and sell to the public. With the fine results obtained in so many cities, this should not be such a hard problem at this time.

That the light-weight car operated by one man has passed the experimental stage and is here to stay cannot be doubted, as the large number of these cars in operation and on order proves that the public is for them. I have always felt that a motorman and conductor on cars operating in cities up to 100,000 population, except perhaps on some heavily traveled lines, is an economic waste. When the motorman is at work the conductor is idle, and when the conductor is at work the motorman, to use the expression of the South, is "just standin' 'round." The new car eliminates this loss.

The proper method of flagging steam railroad crossings is a matter to be worked out by local managers with the aid and advice of the railroad commission engineers. On our property we require the operator to bring the car to a stop at a sufficient distance from the crossing to insure gate clearance. He then leaves the car and goes to the center of the crossing for observation before proceeding. By this method he not only flags the crossing with his eyes but with his ears as well. By requiring him to leave the car one makes certain that he will stop for the crossing

APPLY SALESMANSHIP TO CAR RIDES AS WELL AS TO POWER

Mr. Street Railway Manager, you have something to sell, namely, rides on your cars. At Christmas time, when you are booming the sale of electric washing machines, irons, open gas grates, etc., your new business department has beautiful ribbons and holly tied on them. But you totally forget to put any of that holly or ribbon in your street cars when they start

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*Abstract of paper presented before Wisconsin Electrical Association, March 24, 1921.

out to bring in more nickels than the profit from the sale of all the appliances for the entire month.

Give the street railway an equal chance with the remainder of your business. Provide careful, courteous operators for your cars; have them clean and on time, all the time, not some of the time. In other words, sell your service to the people in such a way that they will want to buy it, and with the savings possible by the new type of car the figures on your balance sheet will be more pleasing at the end of the month.

One-Man Operation Is Very Desirable*

By R. M. Howard

Vice-President Wisconsin Railway, Light & Power Company, Winona, Minn.

MOST of the discussions we hear revolve around the light-weight single-truck car equipped with safety devices, and the tendency has perhaps been along the line of unduly emphasizing the importance of the car rather than the principle of one-man operation. Possibly it has been necessary to do this in order to establish one-man operation, and if so, perhaps we have been poor salesmen in selling the one-man operation idea to the public.

The primary idea of one-man operation is to keep the total cost down to the point where we can sell a ride to the public at a price that will encourage the use of our facilities. If we can only put this idea over to the public and secure the full co-operation of the public, one-man operation will need no defense, and it will become the standard everywhere except in zones of heavy traffic.

As I view one-man operation, the only valid objections that can be made by the public refer to time required to make change and slightly longer time required for loading at heavy traffic points. The odd penny fare complicates change making, and possibly a cash fare for transient and occasional rides sufficiently higher than the regular ticket rate to encourage the use of tickets by say 80 per cent of the riders may be the solution of the fare question.

The delay at loading points is very slight; it seldom has any effect on the schedules, and if the riders can be brought to the realization that the slight inconveniences mentioned insure the maintenance of a lower fare than is possible with two-man operation, it will not matter whether single or double truck cars are used.

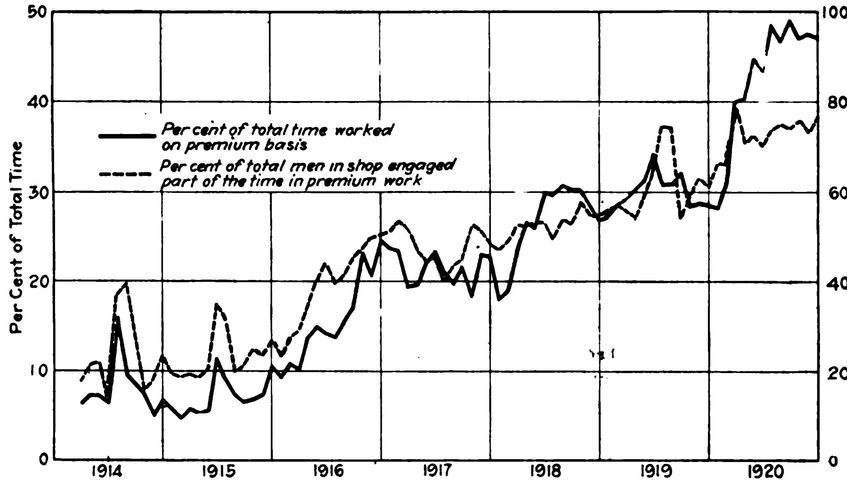
I believe the time is past due for the inauguration of one-man operation on many lines using double-truck cars. We are all suffering from a heavy reduction in earnings. We are carrying a heavier platform wage scale than was ever contemplated when our industry was developed. We are passing through what is politely called an adjustment period. The best adjustment we can make is along the lines of greatly extended use of one-man operation with such cars as our financial situation permits.

I do not want to convey the impression that we are opposed to safety cars, as the reverse is true, and our last purchase was standard safety cars which are operating very satisfactorily.

If the present depression continues we will have to follow the downward curve of earnings with a corresponding drop in operating expenses, and inability to finance or the time required to secure new cars if money is available for their purchase may compel the use of existing equipment with one-man operation.

Results of Premium Wage Plan

IN THE article by J. H. Lucas describing the premium wage plan used in the Milwaukee Electric Railway & Light Company's shop, which was published in the ELECTRIC RAILWAY JOURNAL for March 19, page 529, reference was made to the percentages of the total force engaged on premium work and to the percentage of man-hours time for work done. The accompanying graphs which were omitted from the previous article served to give a picture of present conditions and the increase that has been made since 1914. At the present time 76 per cent of the working force is engaged part of the time on premium work and nearly 50 per cent of all the man-hours time in the shop is for work done against standard time allowances and in a standard manner. The figures taken for arriving at these percentages of working forces and hours are total figures, which include the supervisory time as well as the time of the productive workers. These graphs also show that, due to the necessity for preparatory observations in establishing standard times for the various operations, the extension of the premium system must be gradual and somewhat slow at first.



GRAPHS SHOWING INCREASE IN THE APPLICATION OF THE PREMIUM SYSTEM TO SHOP WORK IN MILWAUKEE

New International Association Formed

THE organization of the new international association of street and interurban railways, mentioned on page 228 of the issue of this paper for Jan. 29, has been completed. The countries included are those in Central Europe. The president is L. Spängler, director of the Municipal Railway in Vienna, and the vice-president is Dr. Wussow, general manager of the Berlin Street Railway System. The members of the executive committee are: J. F. S. Barth, Christiania, Norway; W. von Châtel, Budapest, Hungary; E. Hultman, Malmö, Sweden; Paul Libowitzky, Oderberg, Czechoslovakia; Kai Norregaard, Copenhagen, Denmark, and T. E. van Putten, Amsterdam, Holland. The secretary is Dr. A. Ertel of Vienna.

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*Abstract of paper presented before Wisconsin Electrical Association, March 24, 1921.

Association News

Equipment Committee Holds Busy Session

A TWO-DAY meeting of the equipment committee of the Engineering Association was held at association headquarters on March 23 and 24. The first day of the meeting was taken up with a discussion of the various subjects by sub-committees and the second day with general reports and discussions before the entire committee. Those present were: Daniel Durie, West Penn Railways, chairman; W. S. Adams, the J. G. Brill Company; H. A. Benedict, Public Service Railway of New Jersey; R. H. Dalgleish, Capital Traction Company; James C. C. Holding, Midvale Steel & Ordnance Company; T. R. Langan, Westinghouse Electric & Manufacturing Company; F. H. Miller, Louisville Railway; C. N. Pettinger, Steubenville, East Liverpool & Beaver Valley Traction Company; E. D. Priest, General Electric Company; C. F. W. Rys, Carnegie Steel Company; C. F. Scott, General Electric Company; Karl A. Simmon, Westinghouse Electric & Manufacturing Company, and C. W. Squier, ELECTRIC RAILWAY JOURNAL. In addition to the regular members of the equipment committee, representatives of various manufacturers were present at the invitation of the committee to assist in developing standards for steel wheels, cast-iron wheels and gearing.

The work of revising the association standards for tread and flange contours for steel wheels and preparing a standard wheel contour for cast-iron wheels received considerable attention. This work is progressing very satisfactorily.

The American Gear Manufacturers' Association has drawn up a specification for gearing which is nearly the same as the present standard employed by the association and it is thought that the two specifications can be harmonized without undue difficulty.

In connection with the study of helical gearing which the committee is making, engineers from the General Electric Company presented an interesting demonstration with full-sized models to illustrate the effect of various degrees of helix angle and varying width of face. Representatives of the Westinghouse Electric & Manufacturing Company and of the R. D. Nuttall Company were also present and gave the committee the benefit of their experience in connection with the use of helical gears.

The sub-committee appointed to study the life of wearing parts and to report on shop practices relating to improving wearing qualities of parts is to obtain information from a large number of properties through personal observations made by members of the equipment committee. In order that the type of information obtained may be uniform, a questionnaire was outlined for the use of members only. It seemed probable that a reel or two of motion picture films could be arranged for presentation at the convention to illustrate the best manner of carrying out certain operations that would be of benefit in providing longer life and the chairman of this sub-committee is to obtain opinions regarding practices that appear desirable to have illustrated.

The sub-committee which is studying the present status of direct-current lightning arresters has formulated a questionnaire which will be sent out to all member companies to obtain additional information regarding this subject.

In connection with the design of a typical shop building, decisions were reached as to the number of departments and their relative size that should be accommodated and also various details of construction for convenience, safety and efficient handling of work. Studies have been made of about twenty-five shops and much valuable information is being tabulated. This sub-committee is working in conjunction with the committee on building and structures.

Work of Advertising Section Ready for Distribution

THE Advertising Section of the Division of Information and Service, American Association, has prepared for distribution various pieces of advertising material which member companies may obtain upon application.

The findings and recommendations of the Federal Electric Railways Commission have been epitomized and prepared for distribution in three different forms. There are two cards printed on stiff cardboard, one for wall display, containing briefly the findings and recommendations of the commission, and another a small card for desk use, containing the recommendations only. These cards will be supplied free in any amount to companies desiring them.

A series of fourteen suggested car signs have been prepared in miniature form and may be had free of charge upon application.

Six suggested newspaper advertisements presenting various phases of the Federal Electric Railways Commission report and other material of publicity value to electric railways are in readiness for free distribution upon application.

Two leaflets, "How to Keep the Hired Help on the Job" and "Right Over the Plate," also are ready for distribution. The first of these contains a series of seven constructive suggestions by Paul P. Haynes, a member of the Indiana Public Service Commission, that are of great publicity value. The other leaflet, "Right Over the Plate," is devoted to President Harding's views on the electric railway situation. The outside of the leaflet carries a reproduction of a picture of the President in the attitude of pitching a baseball, which, linked with the title of the leaflet, makes a very attractive and effective cover design. Both of these leaflets are being sold at cost, which ranges from $2.50 to $3 a thousand, depending upon the quantities on order whenever it is deemed advisable to go to press. Approximately three-quarters of a million of these two leaflets have already been ordered. The Advertising Section also has available a summary of all references to electric railway affairs which the various state Governors made in their inaugural or initial messages to their Legislatures this year.

In addition to supplying copy and making suggestions for copy to companies, the Advertising Section is very glad to give suggestions or advice in specific cases when it is desired. Companies that are planning an advertising campaign or are preparing advertising literature can have it reviewed by the Advertising Section upon request.

Accident and Claims Statistics Discussed

ON MARCH 30 the committee on claims statistics met at association headquarters. It was brought out that since last July nearly 150 requests for information on accidents have been answered by the bureau of information. The statistics collected by the committee last year had been the means used to answer these inquiries. In view of the completeness of this data, it was believed that the expense involved in duplicating the information by a further request at this time was unwarranted.

Those present at the meeting were C. F. Briggs, Public Service Railway, chairman; W. F. Weh, Cleveland Railway, and J. S. Kubu, New York State Railways. J. W. Welsh, acting secretary of the association, was also present.

T. & T. Executive Committee Hears Progress Reports

ON MARCH 25 the Transportation & Traffic Association's executive committee held a meeting to hear reports on how the work of the various committees was progressing. It is planned to have all reports in by July 15 so that they can be printed and distributed well in advance of the convention.

Those present in addition to President R. P. Stevens were L. H. Palmer, United Railways & Electric Company of Baltimore; G. T. Seely, Pennsylvania-Ohio Electric Company; J. K. Punderford, the Connecticut Company; T. C. Cherry, Rochester & Syracuse Railroad; J. V. Sullivan, Chicago Surface Lines, and J. W. Welsh, acting secretary. The following committee chairmen read brief reports as to how the work assigned to their committees was progressing. H. B. Flowers for the committee on traffic regulations; J. P. Barnes for the committee on personnel and training transportation of employees; F. W. Coen for the committee on express and freight traffic promotion and costs; G. T. Seely for the committee on merchandising transportation; H. C. Mosher for the committee on economics of schedules; R. E. McDougall by letter for the joint committee on safety.

The resignation of E. B. Burritt as secretary-treasurer was accepted and J. W. Welsh was elected acting secretary to hold office until such time as the American Association elects a permanent officer.

The committee discussed to some extent the lightweight one-man car now rather extensively used throughout the country. In view of the wave of legislation that has recently developed against this type of car, the committee deemed it advisable to call up the whole question of one-man cars before the American Executive Committee at its meeting April 12 for definite recommendations as to what if any further study can be made by the association.

Safety Committee Holds Enthusiastic Meeting

ON MARCH 28 the joint T. & T. and Claims Association committee on safety held its second meeting of the year at association headquarters. Those present were E. C. Spring, Lehigh Valley Transit Company, and R. E. McDougall, New York & Harlem Railroad, co-chairmen; H. O. Allison, Beaver Valley Traction Company, proxy for W. H. Boyce; J. S. Kubu, New York State Railways; C. B. Scott, Chicago Edison Company; A. J. Van Brunt, Public Service Railway, proxy for H. V. Drown, and W. F. Weh, Cleveland Railway. J. W. Welsh, acting secretary, also attended the meeting.

Representatives of the National Safety Council appeared before the committee and explained plans they had in mind for entering the public safety field and asked the committee for its moral and financial support by urging electric railway companies to take out membership in the council. The committee believed that the good results could be obtained by making the joint safety committee a permanent standing committee and the clearing house for the dissemination of information concerning safety work among electric railway companies.

It is hoped that a joint session of the T. & T. and Claims Association can be arranged at the coming convention for the purpose of discussing fully safety work as recommended by the committee and now being conducted by various electric railway companies, not only as it affects its own employees in the shops but the public as well.

Another meeting of the committee is planned for May 10, at which time it is hoped to complete the report.

Meeting of Chicago Elevated Section

THE Chicago Elevated Railroad Company Section met March 22 with about 185 members in attendance. J. H. Mallon, president, occupied the chair. The address of the evening was by A. L. Gardner on the subject of railroad taxation and the speaker described the various taxes which a railroad pays on its different classes of property. There were also two or three musical numbers presented by the Oak Park Trio and William G. Wood, with dancing by Messrs. Ryan and Coleman.

Camden Section Hears New Traffic Ordinance Explained

THE monthly meeting of the Public Service Camden section was held on March 18 at the Newton Avenue carhouse. The guest of honor and speaker was Frank S. Van Hart, president of the Camden City Council. Mr. Van Hart spoke principally on the traffic situation in Camden, explaining the new traffic ordinance in detail. He said the ordinance was designed for the good of the people and the city as a whole and not to favor any particular class.

Mr. Van Hart commended the drive being made by the trainmen to make a better public feeling for the company and said that not only he but also many of his friends had noticed a great improvement in the manner with which trainmen had handled the public in the last few months. He cited actual examples of how trainmen had gone out of their way to please the patrons of the trolley company. Mr. Van Hart also explained that the City Council was always open to new suggestions or criticisms in relation to the new traffic ordinance and would welcome any communications from the trainmen. The Council realized it was impossible to have the ordinance perfect at first, but it felt that after the present arrangement was tried out, additions and betterments would be suggested and put in force to give Camden the reputation of having the best regulated traffic in the country.

Recent Happenings in Great Britain

Wage Court Recommends Continuation of Present Wages Until Dec. 31 Next—Cost of Proposed Glasgow Electrification Found to Be Prohibitive

(From Our Regular Correspondent)

The report of the Court of Inquiry to the Minister of Labor was published on March 8. It says the wage increases have not advanced at the same rate as the cost of living figure. The claim for increase of wages was made last October. Since then the cost of living figure has both risen and fallen. The court cannot predict its future movements. It recommended that the present wage standard should be maintained until Dec. 31 next; that the Industrial Council for the industry should consider the question of standardization, having regard to the earning capacity of the undertakings and to the interests of the public, and that the Council should examine the circumstances of the lower-paid grades with a view to adjusting their conditions on a more satisfactory basis.

IN THE opinion of the board, the Council should also examine the position of those undertakings which have not observed previous agreements and arbitration awards, and those undertakings should be advised that if possible the advances should be paid in full.

It remains to be seen what action the Ministry of Labor and thereafter the tramway employees will take. If the proposals are adopted by all parties there will be peace till the end of the year. By that time the cost of living may have further declined.

The claim of the tramway men was for an increase of wages of 12s. a week. The court of inquiry was set up by the Minister of Labor. The hearings consumed about ten days of time, spread over a period of several weeks. They were concluded on Feb. 18.

No Electrification Projects

The few references to electric traction made by the chairman of British steam railway companies at the annual meetings of shareholders held during February show that while the existing stringent financial and economic conditions endure there is little or no prospect of any new electrification work being carried out. The London, Brighton & South Coast Railway has tried, but so far without success, to get sanction from the Government for completing the electrification of its system. It was revealed by the chairman of the Caledonian Railway that the directors had considered the question of converting their underground lines in Glasgow and some of the adjacent suburban lines, but that the cost and the prospective traffic did not warrant the change.

While the chairman of the London & South Western Railway was able to say that the electrification of the company's suburban lines continues to be an immense success, he stated that the projected conversion of other lines further out of London has in the meantime had to be dropped. When the directors wanted to place contracts for two of these lines (Cobham and Leatherhead), they found that the cost of electrical equipment had advanced to such an extent as to make it very doubtful whether the work could be carried out for £1,000,000, as compared with a prewar estimate of £250,000. All the companies are, in any case, pledged to abstain as far as possible from new capital expenditure until future conditions and the intentions of the Government with regard to the railways are more fully known. In regard to the completion of the electrification of the suburban lines of the London & North Western Railway, which was stopped owing to the war, that work is in progress, and it is hoped that early next year the new lines will be opened, so that electric trains will run out of and into Euston Station.

Dividend Reduced in 1920

The dividends paid by the group of London underground electric railway companies for the past year are even lower than usual, due to the increased cost of labor and materials. It is true that the companies last summer obtained parliamentary authority to raise fares, but the higher charges were in operation only during the last four months of the year. The records for these four months, however, are so encouraging that Lord Ashfield, presiding at the annual meetings of the companies (which were all held on Feb. 17), was able to take a fairly optimistic view of the future. He based himself, not only on the fact that the increased fares have produced a rise in revenue, but also on the confident expectation that the peak has been reached in wages and cost of materials. He thus looks forward both to larger revenue and smaller expenditure. The former may, however, be delayed by the present trade depression. Another encouraging feature is the beginning of co-operation with the London County Council Tramways—a matter to which I have referred in recent articles in these pages.

Lord Ashfield made a comparison of the receipts during the first three and the last three months of 1920, during the latter of which periods the increased fares were in force, and the results are interesting. (It may be recalled that the minimum fare was raised from 1d. to 1½d., with smaller proportionate increases for the longer distances.) On the associated railways the average receipts per passenger rose from 2.2d. to 3.0d. Taking some of the line separately, on the Central London Railway the receipts increased by 35 per cent, on the City & South London Railway by 30 per cent, and on the London Electric Railway by 27 per cent. In most cases there was a slight decrease in the number of passengers. The London General Omnibus Company, which is associated with the underground railways group, shows a deficit on the year's working, but the receipts for the last three months of the year showed an increase over the first three months of 23 per cent. Lord Ashfield is hopeful that matters will so improve that the railway companies will soon be able to raise the additional capital which they require for carrying out various authorized extensions and improvements. At the annual meeting of the Underground Electric Railways, London, Ltd. (the holding company), held on March 3, Lord Ashfield was even more optimistic as to the future.

Reorganization Plans Carried Out

In connection with the London General Omnibus Company it may be of interest to note the increased cost to the company of the recent transfer of taxation from petrol (gasoline) to the vehicles themselves. In 1920 the amount paid in petrol duty was £141,000, while police licenses for the omnibuses cost £17,000 in addition. For the present year the new taxes, which come in lieu of the petrol duty, have been paid to the amount of £229,000. As this tax is charged by the year, the figure mentioned represents the great bulk of the sum which was chargeable in 1921.

The associated London underground railway companies and omnibus and tramway companies have just carried out a reorganization of their administrative staff on very thorough and comprehensive lines. Lord Ashfield remains chairman and managing director of all these companies.

A remarkable expansion of traffic on the Great Northern & City Railway during recent years was mentioned by Lord Aberconway, chairman of the Metropolitan Railway, at the annual meeting on Feb. 10. The Metropolitan Railway, which is quite separate from the London "combine," and is partly a steam system, took over the Great Northern & City line, which is a tube railway, in 1913. Since then the number of passengers has increased by 75 per cent, and the fares now are nearly double those charged eight years ago.

Sir Eric to Retire

It was officially announced in the House of Commons on March 4 that in August next, when the period of state control of British railways comes to an end, Sir Eric Geddes, Minister of Transport, will retire from office. He is at present engaged in the important work of trying to come to a financial settlement with the companies before the railways are handed back to them, and very large sums are involved. Sir Eric who is not a politician, wished to retire some time ago, but was dissuaded by the Government, which values his services as a railway expert very highly.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Segregation Recommended

Citizens' Committee Wants the Railway Returned to Local Control —Court Urges Conference

The Citizens' Committee of Forty, with Hugh McCloskey, former president of the New Orleans Railways & Light Company, New Orleans, La., as chairman of the advisory committee, has submitted its findings on the utility matter to Judge Foster of the Federal District Court. It is a lengthy document. The report was indorsed by every member of the committee save one, Robley S. Stearns.

Among the recommendations made by the committee, which has been at work more than a month seeking to find a solution for the traction troubles of this city, are that the gas plant and the railway should be divorced, the city being given the option to acquire the railway plant. The committee disapproves the service-at-cost plan, but finds that it is impossible to operate the lines at a fare of less than 7½ cents under present conditions and recommends the issuance of railway tickets at the rate of ten for 75 cents.

RAILWAY WORTH $26,000,000

After considering the valuation placed upon the property of the New Orleans Railway & Light Company by the various experts who have been called in to estimate its worth the committee arrives at the conclusion that the railway proper is not worth more than $26 000,000; the light and power establishment $10,000,000 and the gas plant $8,500,000. Wide latitude is recommended in the readjustment of the franchises, tracks and schedules of the railway so as to insure more economical management and better service.

The committee says that the utility to be able to furnish adequate service should be put on a sound financial basis, and that the management should enjoy the confidence, respect and good will of the people of New Orleans. On this point it says:

> To accomplish this much-to-be-desired result your committee first of all recommends that steps be taken which will absolutely insure strictly New Orleans control and management, and will make it impossible for outsiders to gain control of the new corporation for the purpose of displacing the management and perhaps run the company for their own selfish ends, to the great injury of all the elements of our community.
>
> It will not be difficult to work out a plan which will prevent such a recurrence and the committee will be glad to submit its ideas on this subject in detail in due time. In the meantime we merely wish to suggest that five New Orleans citizens in whose integrity and judgment the public has absolute confidence should be selected as "trustees" charged with the duty of selecting and maintaining a reliable and efficient management for the reorganized company.

The minority report of Mr. Stearns holds that the underlying bonds, approximately $11,000,000, should be recognized dollar for dollar; that the $23,000,000 of other major securities should be recognized at what was paid for them; namely, about 80 cents on the dollar, and that the common and preferred stock, about $30,000,000, par value, should be considered lost by bad management.

Judge Foster invited the members of the Commission Council to meet him and representatives of the advisory committee on March 28 to try to formulate some definite plan of action looking to a solution of the trouble.

Frankford Elevated Operating Contract Up Again

The terms of operation of the Frankford elevated by the Philadelphia Rapid Transit Company are again up for consideration. It seemed probable that the matter would go before the Council on March 31.

Agreement appears to be general that a fare much higher than 5 cents would have to be charged if the road were run by the Philadelphia Rapid Transit Company separate from its other lines and that if the new line were tied in with the present system the rate of fare now in effect for the entire city would have to be increased slightly.

It has been indicated that the Philadelphia Rapid Transit Company, if it is to operate the new line, would want to put into effect at once an increase in its present fare, although the elevated line is not expected to be ready for service until about January, 1922. In this way it might be possible to accumulate a fund against the deficit in the operation of the elevated which is regarded as certain to follow when the line is placed in operation.

The attitude of the Philadelphia Rapid Transit Company on the matter is reflected unmistakably in a letter from President Mitten to the Mayor. Mr. Mitten said:

> Since our meeting of yesterday I feel that I should now state that, with the approval of the Public Service Commission, I am willing to undertake the added burden imposed by the Frankford "L" and Bustleton line, without increasing the basic fare of 7 cents cash, but with the change to five tickets for 35 cents instead of four tickets for 25 cents as now.
>
> Since the operation of the Frankford 'L' during 1921 is the goal toward which we have all long been striving I would suggest that the legal departments of the city and company make every effort to cut the red tape surrounding the awarding of construction contracts by the city, to the end that all possible construction work on Frankford "L" be turned over to P. R. T. for completion, so that its effective organization can be immediately directed to this accomplishment.

Nothing to Conceal

Indianapolis Company Resents Implication that It Tricked City in Fare Appeal

The Indianapolis Street Railway and the Citizens Gas Company are the only Indianapolis public service corporations which have franchise agreements with the city. Both of them have petitions for higher rates pending before the Public Service Commission. Both aver that emergencies exist which require relief, the 1913 public utility law authorizing the commission to act in emergency cases, regardless of franchises. Neither company, however, is affected by the Knapp law, passed by the last Legislature, in which opportunity to surrender franchises is afforded public service corporations.

The Knapp law will go into effect with the general promulgation of the 1921 acts, probably in May. After that time the Indianapolis companies may surrender their franchises and operate entirely under the commission. This fact, however, has thus far had no bearing on the relief petitions pending before the commission on the emergency basis. The emergency set out by the railway company is a cash deficit.

COMPANY ANSWERS THE CITY

A statement issued by Dr. Henry Jameson, chairman of the company board of directors, discussed the attitude of Samuel Ashby, corporation counsel, who has said the city will oppose the company's petition for increase in fares. Dr. Jameson's statement said in part:

> In the matter of the petition of the Indianapolis Street Railway to the Public Service Commission, filed on March 14, asking for needed relief in the matter of increased fares, Samuel Ashby, corporation counsel, makes the statement that he "has reports of the financial condition of the company up to a few months ago," thereby leaving the inference that he has been denied any information in recent months in regard to the company's financial situation. This implication is at once unfair to the company and unfair to the city. It has been the attitude of this company at all times cheerfully to furnish any and all information to the city and to the Public Service Commission in order that a broad and constructive policy might be followed for the benefit of not only the city but of the patrons of the company.
>
> Mr. Ashby further states that "the petition was filed without the knowledge of city officials." Mr. Ashby was present and represented the city in December on the petition of the company asking that a charge of 2 cents for transfers be authorized. Mr. Ashby was fully advised of all of these matters and fully represented the city and did not demur to this order.
>
> It is manifestly unfair and erroneous to attempt to create the impression that the company is attempting some action without the city's being fully advised. Personally, I wish to state that this company wishes at all times to keep the city fully advised and to act with it in a spirit that is friendly and constructive and will accomplish the purpose of securing not only better service, but much needed extensions.

Emergency Commission Bill Signed

Governor of New York Approves Measure Providing Relief from Intolerable Conditions in New York City

Governor Miller of New York on March 30 signed the so-called Knight-Adler bill creating a transit commission to take sole charge of New York City's transportation lines and reorganizing the Public Service Commission for the State. The new law became effective at once. There has been much speculation in regard to the selection of appointees to the new commissions, but it is not expected that the Governor will announce the names of the new commissioners for a week or ten days.

THE measure signed by the Governor is the result of the special message of the chief executive of the state to the Legislature on Jan. 24, relating to regulation of public utilities, with special attention to the urgent condition presented by the transit situation in the city of New York. The Governor declared the vital need was the creation of an agency to deal with public utilities with ample and undivided authority and responsibility.

The bill as passed consists of 124 printed pages. Provisions requiring special attention are, however, confined to comparatively few sections. The act amends the Public Service Commission Law, abolishes the Public Service Commissions for the First and Second Districts and the office of the Transit Construction Commissioner and establishes a single Public Service Commission of five members appointed by the Governor at a salary of $15,000 a year for ten years to have statewide jurisdiction embracing the same class of public utilities as are now under the jurisdiction of existing commissions.

PROVISION FOR EMERGENCY RATES

The act also creates a Transit Commission of three members for a term of five years with an annual salary of $15,000 to have jurisdiction within cities having a population of more than 1,000,000 (New York City), over railroads, street railroads and stage or omnibus lines lying exclusively or partially within such city, and "to such portions of any railroad as lies within such city and is used for local service and is not operated as part of a trunk line railroad."

In addition to all the regulatory powers possessed by the present commissions, both new commissions are given increased power for regulating rates, fares and charges of corporations coming within their respective jurisdictions—including holding companies. They are given power to determine "just and reasonable rates, fares and charges to be thereafter observed and in force as the maximum to be charged for the service to be performed, notwithstanding that a higher or lower rate, fare or charge has been heretofore prescribed by general or special statute, contract, grant, franchise, condition, consent or other agreement, and fix the same by order."

The new commisssions are empowered to order temporary increases or decreases in rates pending the final determination of rate cases before them. All these provisions for regulating rates and fixing temporary rates apply to gas and electric corporations, steam companies and telephone and telegraph companies as well as transportation companies.

In response to the Governor's suggestion that the foundation be laid for a completely unified system of transportation in the city of New York, Article VI is to be added to the Public Service Commission Law. The subject matter of this article directs the Transit Commission to prepare a plan of readjustment for the relief and improvement of transit with a view to "the combination, rehabilitation, improvement and extension of existing railroads," securing sufficient operating revenue on rapid transit lines to make the city's investment self-sustaining and take it out of the debt limit, and with the further view to "the readjustment of the existing rights and obligations of the railroad companies so that the real values in the railroads may be protected and the securities stabilized." The commission is also directed to "cause a valuation to be made of the physical property used in public service of the railroads it proposes to include" in such plan. Such valuation is to be made the basis for all allowances to the railroad companies under the plan. From the valuation so found there is no provision for appeal.

PUBLIC HEARING BEFORE ADOPTION

Procedure for the adoption of the new plan for relief for the companies in Greater New York as outlined in Section 107 of the bill calls for a public hearing before adoption. After adoption the plan must be submitted to the public authorities (Board of Estimate) for approval. This procedure would appear to be merely a matter of form, for if in the judgment of the commission there is justification for carrying out the plan, the commission is directed to proceed with the preparation of contracts, plans and specifications and such other action as may be necessary to carry it out, and "may in the name and in behalf of the city execute and deliver such contract or contracts with full legal force and effect as if all approval of the local authorities had been given," any law to the contrary notwithstanding. The right to accept or reject the program laid down by the commission is, however, made optional with the companies involved. It is to the provision of this section particularly that exception is taken by the city of New York, on the strength of its acknowledged investment of more than $300,000,000 in the present rapid transit lines.

The section empowering the commission to prepare a plan for the readjustment provides that the plan advanced by the commission shall contain provisions which in the judgment of the commission will accomplish as nearly as may be the following four main purposes:

1. The combination, rehabilitation improvement and extension of existing railroads so that service thereon may be increased and improved to the fullest extent possible.
2. The receipt by the city of sufficient returns from the operation of the railroads so that the corporate stock or bonds issued by the city for the construction of rapid transit railroads may be exempted in computing the debt incurring power of the city under the constitution of the state.
3. The readjustment of the existing rights and obligations of the railroad companies so that the real values in the railroads may be protected and securities stabilized.
4. The assuring to the people of the city the continued operation of the railroads at the present or lowest possible fares consistent with the just valuations of the railroads and their safe and economical operation.

Little Hope for Texas Utility Act

Municipal home rule representatives in the House of the Texas Legislature by incorporating in the proposed utility act many amendments injurious to utilities have forced proponents of the bill to kill it by striking out the enacting clause. This development leaves little hope for state utility relief until the next biennial session of the Legislature.

The bill was drafted by a committee appointed by the Governor and consisting of an equal number of representatives of municipalities, utilities, state commercial bodies, House of Representatives and Senate. The original draft of the bill as prepared by the representatives of the municipalities was very drastic on utilities. Many open hearings were held by the committee, however, and a greatly amended final draft was passed by a large majority of the committee, only the municipal representatives reporting adversely.

The measure then was introduced into the House and Senate and after being favorably reported in both Houses was passed by the Senate. It was held up in the House by municipal home rule representatives and so loaded with clauses inimical to the interests of public utilities that it became necessary to kill it.

Northwest Developing Vast Water Power Plans

With the Chicago, Milwaukee & St. Paul Railroad electrified over most of its Rocky Mountain-Pacific section, the Great Northern intimating it has additional electrification plans in mind and intense interest shown by other railroads in the prospective development of a large hydro-electric plant at Wallowa Rapids on the Columbia River, it would appear as if the days of coal in the Pacific Northwest were numbered as a main factor in major transportion. The Great Northern plans extensive development of its Chelan River plant, while the Washington Water Power Company, now supplying current to the Chicago, Milwaukee & St. Paul road, is developing an additional 15,000 hp. at Spokane and investigating the possibilities of power development at Kettle Falls, north of Spokane. The outlet for this additional power is undoubtedly the railroads, although no definite statement has been made.

In the passage at arms between Seattle and Portland anent recent rate adjustments from Inland Empire points to Portland the statement was made at Seattle that the rate was not justified as the Chicago, Milwaukee & St. Paul Railroad was now hauling freight to Seattle over the Cascade Mountains at a lower per ton cost than the Spokane, Portland & Seattle road could deliver commodities at Portland with water grade down the Columbia River for the entire distance. This would appear to be a most interesting commentary on the advantages of electricity as applied to major railroad operations.

Campaign Renewed for Jitneys on Broadway

The Broadway Association, New York has again raised the question as to whether the present electric railway on Broadway shall be replaced with lines of buses. This activity is similar to a move made by the association about a year ago. The questions submitted then, however, were confined to a referendum among the members of the association itself. The referendum vote is asked on these questions:

> Are you in favor of a through line operated from Bowling Green to Kingsbridge for a single fare without transfer?
>
> Are you in favor of the continued use of the present type of green car on Broadway south of Forty-fourth Street?
>
> Are you in favor of the removal of the street car tracks and the substitution of a modern bus system operating on Broadway?

The circular of the association says:

> Reliable information is that a bus line can be profitably operated on the entire length of Broadway in Manhattan for a single fare.

City Refuses to Stop One-Man Cars

Union labor organizations in the city of Sacramento, Cal., recently tried to get the City Commission there to refuse to allow the Pacific Gas & Electric Company to operate one-man cars in that city. They opposed the one-man car on the ground of safety. The company succeeded in proving that the one-man cars were not unsafe. The opposition then switched to the claim that the commission should rule the cars out on the ground of civic pride. Finally, the labor organizations came out in the open and admitted that their opposition to the cars was based on the belief of their being inimical to the best interest of labor. The measure was defeated thereupon by a vote of four to one. The State Legislature is now considering similar union labor measures to prohibit the use of one-man cars anywhere in the State.

Hot Campaign Closing in Detroit

Private Company and City Engaged in Frantic Effort to Win the Public Vote on April 4

With the approach of the election at Detroit, Mich., on April 4, when two questions pertaining to railway matters are to be placed on the ballot, the Detroit United Railway is urging the adoption of its service-at-cost ordinance as a means to settle the railway controversy in Detroit, while the Street Railway Commission is urging the people to approve the purchase by the city of about 25 miles of Detroit United Railway lines.

THE D. U. R. has been conducting a campaign to educate the voters as to the provisions of the company's ordinance, using newspaper advertising and street car posters, fostering public discussions and sending copies of the proposed ordinance to each registered voter in the city. *Electric Railway Service*, the company's weekly publication, has also devoted considerable space each week to analyzing the company's proposed ordinance.

FOUR MAIN POINTS CONSIDERED

F. W. Brooks, president of the Detroit United Railway, is quoting Delos F. Wilcox's pamphlet "Flexible Fares" against Mr. Wilcox. Mr. Brooks states that the Detroit plan has been patterned after the Cleveland plan with such additions and improvements as in the years of Cleveland experience, have been found necessary to improve the measure. He further maintains that every minor fault that Mr. Wilcox has ever expressed in print with the Cleveland plan has been corrected in the Detroit service-at-cost plan, and that in Detroit as in Cleveland, service-at-cost means peace and order instead of strife and chaos.

On the other hand the city officials have sent out to the voters a pamphlet containing an official report to Mayor Couzens by Delos F. Wilcox, analyzing what is termed "The D. U. R. Square Deal Service-at-Cost Franchise." It is stated in the pamphlet over the signature of Mayor Couzens that the services of Mr. Wilcox were secured that the citizens might get the best possible analysis of the Detroit United Railway plan by a neutral authority.

CHIEF OBJECTIONS OUTLINED

A summary of what appears to Mr. Wilcox to be the chief defects of the ordinance from the public point of view enumerates: granting a thirty-year blanket franchise; highest valuation for the company property; no-limit fare; appeal to the courts wiped out; premium on inefficiency; Detroit United Railway wrote its own contract; possibility of abrogation of the terms of the contract through legislation or action of the State Utilities Commission without the city's consent.

The city's pamphlet also summarizes briefly a number of undesirable features of the service-at-cost ordinance pointed out by the Corporation Counsel, and after reviewing briefly the progress made by the Street Railway Commission since April 5 last, when the $15,000,000 bond issue was approved by the people, explains the provisions of the city's purchase plan. The purchase plan is stated to be a progressive step in carrying out the municipal ownership plan approved by a 63 per cent vote of the people last April. The lines in question will be purchased with money derived from the original bond issue and additional funds are not required.

Several suits involving the city and the Detroit United Railway are still pending, among which is the action brought by the Detroit United Railway against certain city officials involved, for contempt of court in not obeying the temporary restraining order against the city crossing the Mack Avenue line with the tracks of the St. Jean line of the Municipal Railway. John A. Mercier, the contractor who constructed the first stretch of municipal roadbed last year, has brought suit against the Street Railway Commission to prevent the city from going ahead with construction work with its own forces on a stretch of line where Mr. Mercier holds the contract to do the excavating and to lay the concrete bed. A different type of construction is now being used by the Street Railway Commission and the contractor refused to change his contract to conform with the new specifications. Considerable money can be saved by changing to the new type of construction, Joseph S. Goodwin, manager of the municipal lines, believes.

Taxpayers' Suit Heard

Arguments on the motion of the fourteen taxpayers to dismiss the Stone & Webster suit to enjoin them from making the Puget Sound Power & Light Company a party to their suit against the city of Seattle, in the matter of disposition of funds of the Seattle Municipal Railway, were completed recently in Judge Jeremiah Neterer's Court, along with arguments on the company's plea for an injunction against the taxpayers. Judge Neterer reserved decision in the action of the company against the taxpayers.

Attorneys for the traction interests sought to show that the taxpayers contemplated an attack on the special fund created in the contract for payment of bond interest and principal. He asked whether the court would shut the door on the company and make it take its chances on what would happen on Sept. 1, when the next interest payment is due, and on March 1, when $833,000 of the principal is due as well. Attorneys for the taxpayers denied that any breach of contract was sought, but that the action was simply taken to protect the city's general fund.

43 per Cent Wage Reduction

Company at Davenport Unable Longer to Stand High Wages, Jitney Competition and Political Opposition

Unable longer to bear the brunt of unregulated jitney operation, high wages and continued political opposition from a Socialist City Council, the Tri-City Railway, Davenport, Iowa, on March 25, notified employees on the Iowa lines that a 43 per cent reduction in wages would go into effect on April 1. The new scale for trainmen will be: Men under six months, 36 cents an hour; men over six months and less than one year, 38 cents an hour; men one year or over in company employ, 40 cents an hour; shop and carhouse men, 40 cents maximum.

THE present scale carries a 70-cent maximum and has been in force since June 1 last. It was negotiated under the condition that the company receive sufficient fare to pay the increase in wage. It was agreed on following arbitration.

Since that time the City Council in Davenport has refused to allow the company to install one-man cars, has threatened an increase in taxation and has repeatedly refused to increase fares, the traction lines finally being forced to go into court and secure by injunction a 9-cent fare, with three tickets for a quarter. This fare has, however, been greatly discounted by unregulated taxi and jitney competition.

The railway recently went into court and secured an injunction against forty-six of the jitney buses which were violating the city ordinances and which the Socialist City Attorney refused to stop.

UNION CHIEF DISCHARGED

The president of the local union of railway employees made a speech at the City Council attacking one-man cars, a speech which is regarded as largely instrumental in the defeat of this plan of operation. The union head also criticised company discipline and was discharged as a result of a statement the company declares was untrue.

Members of the City Council asked the head of the union to apologize to President B. J. Denman of the traction lines, but he refused to do this and a strike vote followed by the Davenport, Rock Island and Moline trainmen. No date was set for a strike but negotiations have so far proved fruitless. In the face of this situation the company has announced the reduction in wages.

The men, in the effort to secure the reinstatement of their deposed chief, have invoked state arbitration through Governor N. E. Kendall of Iowa under a law of 1913. This law makes investigation of the case at issue by an arbitration board compulsory on the petition of more than twenty-five disinterested parties. The Governor has notified the company and the trainmen to select five names each, from which he will appoint two arbiters, these two to select a third.

The finding of the board, however, is not compulsory unless both sides to the controversy agree to accept its decision and the Tri-City Railway has signified unofficially that it will not accept this decision as it does not consider the discharge of a man on the ground of disloyalty as a subject to be arbitrated.

The company, however, has evinced a disposition to arbitrate the new 40-cent wage scale, but not on the basis of the present 70-cent scale. The company will likewise refuse to agree to accept the finding of an arbitration board on a wage scale if it considers the finding of the board in terms of wages beyond its financial ability to pay.

Massachusetts Strike Threat

Amalgamated Regards Retrenchment Program of Eastern Massachusetts as Attempt to Crush Union

Reply has been made by the Amalgamated Association at Boston, Mass., through Counsel Vahey to the notification issued on Feb. 25 by the trustees of the Eastern Massachusetts Street Railway that at the expiration of the existing wage and working agreement on May 1, a reduction of 20 per cent in wages would go into effect. The trustees further stated that they desired and intended to cancel the entire agreement at that time, and that their letter should be construed as an official notification of that intention in accordance with the terms of the agreement as to changes, amendments or continuation.

Formal action on the matter was not taken before on account of the absence of Mr. Vahey from Boston. After reviewing the situation Mr. Vahey issued a lengthy statement to the papers denying the right of the trustees to cancel the agreement in its entirety and charging an attempt to disrupt and break up the union. Mr. Vahey takes the stand that the trustees are distinctly antagonistic and unfair to organized labor and that they have taken an arbitrary and unwarranted stand in the present instance, in refusing to arbitrate the matter. He intimates such action may cause the men to strike.

As a matter of fact the trustees have not made any statement relative to what position they will take should arbitration be suggested or demanded. Their attitude is that the public is demanding lower fares and the biggest obstacle to any fare reduction is the present wage scale.

Letters have been sent by the trustees to the local "Home Rule Committees" of citizens in the various cities and towns served by the company, inviting them to meet the trustees to discuss the expected reductions in wages and to express their opinion and discuss as to the best means of passing along the reduction to the public. It is the announced intention of the trustees to return to the public every dollar saved by wage reductions, either by equivalent reductions in fares, improved service or both. In all their published statements the trustees are standing squarely on the issue that lower fares for car-riders hinge on lower rates of wages.

The accompanying comparison of hourly wages of the various classes of employees in 1915 and 1920 has been issued by the trustees.

The trustees have received a petition for the restoration of service in Gloucester, Mass. Service there was suspended nearly a year ago as the lines did not earn expenses and the city authorities failed to agree to make up the deficit by taxation. This latest petition is of especial interest as it was signed by some of the former employees who have been out of work since the cars ceased to run. These men have now expressed their willingness to work at the reduced rate of wages which the trustees have announced to go into effect on May 2, on the entire system.

Officials of the union have denied that the Gloucester men would work at the proposed wage scale, but the trustees have the petition bearing the signatures of a number of the men.

COMPARISON OF WAGES OF EASTERN MASSACHUSETTS STREET RAILWAY EMPLOYEES

	Cents per Hour			
	1915	1920	Increase	Per Cent
Conductors and motormen	26.83	62.00 *66.74	35.17 39.91	131.1 148.7
Car cleaners	21.89	58.00	36.11	164.9
Watchmen	18.38	58.00	39.62	215.4
Armature winders	28.24	63.00	34.76	123.1
Pitmen	24.80	61.00	36.20	156.5
Machinists	27.62	63.00	35.38	128.1
Carpenters	28.88	62.00	33.12	114.7
General helpers	20.72	58.00	37.28	179.9
Trackmen	22.2	58.00	35.8	138.8
Firemen	27.76	66.00	38.24	137.7
Oilers	25.93	62.00	36.07	139.1
Assistant engineers	33.76	76.00	42.24	125.1

*Operators of one-man cars.

Jersey Jitneys Jolted

Following a prolonged debate the Senate of New Jersey by a vote of twelve to three has passed the measure regulating jitneys and placing their operation in certain particulars under the jurisdiction of the Public Utility Commission. The bill, effective from March 15, does not affect jitneys in operation prior to that date.

News Notes

City Road Made All-American. — Twenty-five employees on the Seattle (Wash.) Municipal Railway who have not become American citizens will be removed from the payroll and supplanted by citizens.

Wage Settlement Expected.—No decision had been reached up to March 29 on the wage contracts submitted by the carmen's union to the Community Traction Company, the successor to the railway property of the Toledo Railways & Light Company, Toledo, Ohio.

Texas Line Reduces Wages.—The Wichita Falls (Tex.) Traction Company has announced a reduction of 11 per cent in wages of conductors and motormen, the cut to be effective from March 15. Decreased revenue is assigned as the cause. The trainmen have accepted the wage cut.

Bill Against Expenditures for Publicity.—A bill was introduced in the Assembly of New York on March 8 by Mr. Antin adding new section 230a to the Public Service Commissions Law, providing that no expenditure for publicity purposes by any corporation subject to jurisdiction of Public Service or Transit Commission shall be allowed as an element in fixing fares or charges.

City Sues to Recover for Paving.—The city of Danbury, Conn., has filed a suit to recover $18,000 damages from the Danbury & Bethel Traction Company due to the fact that the city was forced to pay for the paving of the tracks of the railway last year because the company did not have enough funds to carry out the work. Corporation Counsel Samuel A. Davis has filed complaint in the Superior Court at Bridgeport in the interest of the city.

Mayors Opposed to Traction Measure.—A measure has recently been introduced in the Legislature by Assemblyman George D. Brady, Buffalo, which would vest in the Public Service Commission power to regulate the amount of pavement costs to be paid by traction companies regardless of agreements between companies and municipalities in which they operate. The State Conference of Mayors cited thirty-one reasons in opposition to the bill.

Brooklyn Lines Assessed Too High.—The Brooklyn City Railroad, the Prospect Park & Coney Island Railroad, the North Beach Railroad and several other Brooklyn surface and elevated lines were granted recently by Justice Manning in the Supreme Court a writ of certiorari requiring the State Tax Commission to show cause in Albany on May 9 why the franchise assessment of the lines should not be reduced. The total amount of the assessment is $39,077,930, which the lines contend is $13,704,132 too much.

Chamber of Commerce Plans Railway Survey.—A plan for a special committee of five men to make a survey of the operating and financial conditions of the Pittsburgh (Pa.) Railways, with a view to assisting the company to better local conditions, was adopted by the Chamber of Commerce of Pittsburgh on March 16. The resolution asking for the appointment of the committee was sponsored by the chamber's regular committee on municipal affairs and approved by the board of directors.

Bills Still Being Introduced.—Considerable legislation continues to be introduced in the Indiana General Assembly affecting interurban lines. A bill passed the House recently by unanimous vote empowering the Public Service Commission to prescribe headlight regulations for interurban cars. A strong attempt was made on the part of enemies of public utilities to pass the Harris House bill, which would compel electric railways whose lines cross those of steam roads to pay for the upkeep of the crossing on a wheelage basis. The bill has been indefinitely postponed. This kills it so far as the present session is concerned.

Railway Employees to Hold Reunion. A reunion of all employees of the Massachusetts Northeastern Street Railway, Haverhill, Mass., will take place at Canobie Lake Park, Salem, N. H., on May 20, for the benefit of the mutual relief fund of the company. This Mutual Relief Association is an incorporation formed for the purpose of furnishing death benefits and relief to ill and disabled employee members of the association. During the past season the association paid out more than $1,700 in sick and death benefits and all efforts will be made to raise this amount in the spring meeting.

Electrical Workers Return.—After a strike of sixteen days, the electrical workers, including linemen and substation operators of the British Columbia Electric Railway at Vancouver and Victoria have returned to work. The dispute was over wages. The company rejected the award of a conciliation board on the ground that its decision was based on conditions last August and offered a 10 per cent reduction. The deadlock was broken by the company granting the men their requests and signing up an agreement on the basis of the award. During the strike, the light, power and railway service was maintained by the substations being operated by office employees of the company.

Indictments Dismissed. — Supreme Court Justice Edward Lazansky has dismissed the indictment against officials of the Brooklyn (N. Y.) Rapid Transit Company, which were secured following the Malbone Street tunnel wreck in 1918. In the accident more than ninety people were killed and several hundred were injured. The officials of the road from the motorman to the general manager were indicted but no convictions were secured. District Attorney H. E. Lewis, on whose motion the indictments were dismissed, stated to the court that in view of the circumstances as to the evidence and the great expense attached to the trials he did not feel justified in again bringing the men to court.

Active Year for Safety League.—The Ontario Safety League, Toronto, Canada, recently published a statement reviewing its activities and accomplishments for the year 1920. In an effort to prevent accidents the league has carried on an intensive and extensive campaign throughout the province of Ontario. By the distribution of bulletins, circulars, leaflets, etc., and by means of conferences, posters, motion pictures and lantern slides, the appeal has reached practically every city and town in Ontario. The most notable activity of the year was a three-day safety convention in April last, at which important papers were read and discussed by representatives of industry from Ontario, Quebec, Nova Scotia and Manitoba. This convention together with a "Safety Week" drive in October had far-reaching effects.

Des Moines Railway Starts Advertising Campaign.—Homer A. Miller and F. C. Chambers, receivers for the Des Moines (Ia.) City Railway, have started an advertising campaign to acquaint the car riders of that city with the comparison between the general good done in Des Moines by the company and its competitor, the motor bus. Every day during the week ended March 26 an advertisement appeared in all of the city dailies, each message being devoted to some particular side of the question in the war between the railway and the buses. In addition to the newspaper advertising letters have been mailed to a large number of business men of the city to give them a better understanding of the actual situation.

Perpetual Franchise Upheld. — An opinion was handed down by Judge A. M. J. Cochran in the United States District Court at Covington, Ky., during the week ended March 26, in which he held that the South Covington & Cincinnati Street Railway has a perpetual franchise on certain streets in Fort Thomas, Ky., and that an ordinance is void that was passed by the Board of Trustees of Fort Thomas on Feb. 16, 1917, by which it was sought to compel the company to pay rentals on Mt. Pleasant, Dundee and Highland Avenues. The suit was filed by the railway against the town of Fort Thomas three years ago, seeking an injunction to prevent the collection of rentals on the thoroughfares mentioned. Judge Cochran held the certain grants made by the Highland Park Land Company were legal and that the company had installed tracks on some of the streets before they were used as thoroughfares in the town of Fort Thomas.

Financial and Corporate

P. S. Net Falls

Passenger Revenue and Traffic Increase of 15 per Cent Fails to Offset Increased Costs

According to the twelfth annual report of the Public Service Railway, Newark, N. J., for the year ended Dec. 31, 1920, the company did not earn sufficient to meet operating expenses and fixed charges excluding any amount for amortization and depreciation.

In speaking of rates the report said that the efforts to secure a rate adequate to requirements have, broadly speaking, been practically continuous since early in March, 1918, when the first application was filed with the Public Utility Commission.

INCOME STATISTICS—PUBLIC SERVICE RAILWAY

	1920	1919	Per Cent Change
Passenger revenue	$26,200,000	$22,600,000	+15.9
Operating revenue	27,881,990	24,146,251	+15.5
Non-operating income	108,706	71,774	+51.4
Gross revenue	27,990,696	24,212,025	+15.0
Operating expenses and taxes	$23,548,878	$19,624,065	+20.0

TRAFFIC STATISTICS—PUBLIC SERVICE RAILWAY

	1920		1919	Per Cent Change
Miles of line	538.173		539,031	— 0.16
Miles of revenue track	851.390		852,310	— 0.11
Total revenue per mile of line	$52,000		$43,100	+20.5
Total revenue per mile of revenue track	$32,900		$27,250	+20.7
Revenue passengers	363,757,587	(a)	327,619,606	+11.0
Transfers and passes	89,777,107		69,069,628	+30.0
Total passengers	453,534,694		396,689,234	+14.3
Percentage of passengers using transfers	17.7		15.4	(b) + 2.3
Average fare per passenger (cents)	5.79		5.71	+ 1.4
Car-mileage	60,798,743		57,644,927	+ 5.5
Car-hours	6,539,207		6,039,453	+ 8.2
Passengers carried per day	1,239,166		1,086,820	+14.1
Passenger receipts per car-mile (cents)	43.21		39.29	+10.0
Per car-hour	$4.02		$3.75	+ 7.2
Ratio car-miles to car-hours	9.30		9.54	(b) — 0.24
Estimated population served	2,423,225		2,125,356	+14.0
Rides per capita	187		186.5	+ 0.27

(a) Mile zone system in effect Sept. 14 to Dec. 7, 1919.
(b) Difference.

The 1919 report expressed the hope that there remained but the presentation of certain testimony collected by the commission as to real estate values, summing up by counsel, and decisions by the commission to fix the value of the company's property. The last formal hearing in the case was held on Feb. 26, 1920, and a reasonably prompt decision was generally expected, but certain circumstances intervened to prevent.

The Legislature of New Jersey, the report goes on to say, in response to a well-defined public demand for an independent valuation of street railway property, passed an act which became effective May 5, 1920, creating a special commission of state officials authorized to appoint a firm of engineers to appraise the properties of any or all of the street railway companies in the state. The act provides that the valuation of a property so determined is to be accepted as evidence by the Public Utility Commission in its determination of a reasonable rate for that company.

Subsequent to the passing of this act the Public Utility Commission took no further action in the matter of fixing the value of the railway's property. Pursuant to the act, Ford, Bacon & Davis, New York, were selected to make the valuation. Work was undertaken about Aug. 1 and the valuation is expected to be completed very soon.

On Dec. 7, 1920, the railway filed with the Public Utility Commission a schedule of rates calling for a 10-cent fare with free transfer, to be effective Jan. 1, 1921. This rate was suspended by the utility commission pending hearings, but the removal of the commissioners made hearings impossible. With the appointment of a new commission and the completion of the valuation of the company's property an early determination is expected.

Notwithstanding former trying experiences, the year 1920 was one of the most difficult. During more than three months weather conditions made operation not only difficult but expensive. By the use of all its facilities and almost superhuman efforts on the part of the operating force during the severe storms, the lines were kept in operation, reflecting great credit on the personnel and a most favorable comparison between this and other systems operating in large communities where many sections were not operated for a considerable period after such storms. Again, during the outlaw strike of steam railroad labor in the spring of 1920 commutation train service on practically all railroads was suspended and the burden of transporting commuters from the northern part of the state to the several ferries reaching New York City was handled by the railway in a way that merited general commendation.

The labor situation during the greater part of the year was a difficult one, not only on account of shortage by reason of the higher rates paid by other industries, so that on May 1 the company advanced the pay of trainmen 5 cents per hour and made corresponding increases in other departments.

To provide improved service, particularly on lines of light traffic, by giving a shorter headway with more economically operated equipment, 200 safety cars which can be operated by one man were adopted. On Sept. 5, 1920, the first regular service with this type of car was started on the Riverside line in Paterson. By the close of the year seventeen lines in Passaic, central division, had been equipped with these cars, the service of which is satisfactory and fully up to expectations. In order to accommodate the dense traffic on heavy city lines, where the small safety car is unsuitable, the trailer type of car was adopted. At the close of the year only one of the 100 ordered had been received. This has been tried on a number of different lines and operates in a very satisfactory manner.

In order to provide better facilities for coping with snow troubles, fifteen double truck snow plows and sixteen single truck snow sweepers were also contracted for during the year.

During the year 18.97 miles of track was reconstructed of new rail and 4.102 miles with same rail. Track extensions built during the year totaled 1.468 miles. The total trackage of the system now is 897.721 miles.

The ferries operated by the company from Edgewater and Bergen Point showed substantial increase in business during the year. During labor troubles in New York Harbor, however, the ferry employees of this company remained loyal and service was not interrupted from that cause.

The cost of claims against the railway including expenses of administration during the year was $1,276,846.46, or 4.9 per cent of the gross receipts. Notwithstanding the increased number of vehicular accidents due to the large use of motor vehicles, the figures compare favorably with the previous year in which the cost amounted to 5.3 per cent of the gross receipts.

Statistics as to operation are presented in the accompanying tables.

La Fayette Company Organizes

The La Fayette Service Company, La Fayette, Ind., which some time ago took over the La Fayette section of the Fort Wayne & Northern Indiana Traction Company, has announced its permanent organization as follows: President, Walter L. Haehnlen, Philadelphia, Pa.; vice-president, Clyde W. Reed, Fort Wayne, Ind.; secretary-treasurer and general manager, R. W. Levering, La Fayette, Ind.

Franchise Abrogation Bill Seems to Be Doomed

Abrogation of the perpetual franchises enjoyed by the Columbus Railway, Power & Light Company, on certain streets of Columbus, Ohio, proposed in the bill introduced by Senator J. F. Atwood of Columbus, seems very unlikely as the result of the action of the Ohio Senate last week in sending the bill back to another committee.

The measure has been reported out by the committee on cities with recommendation for passage, but when it came up on the calendar for passage a determined attack upon it by Cleveland and Cincinnati Senators resulted in its being referred to the public utilities committee, which is said to be anything but friendly to the measure. In view of the vote in favor of recommitment the possibility of the bill coming out now seems very doubtful.

Opposition on the part of the Cincinnati and Cleveland solons is due to the fact that many citizens and institutions in those cities own stock and hold bonds of the Columbus Railway, Power & Light Company, which would be still further depreciated if the future of the company and its credit are made insecure by repeal of the perpetual franchises.

Senator Atwood introduced the bill at the request of a group of Columbus citizens interested in making it possible for the city to obtain terms from the company when the present blanket franchise expires in 1926. Only by legislative action can the perpetual franchises held on streets other than those covered by the blanket franchise be terminated, and it is charged that undisturbed retention of the franchises gives the company a hold in Columbus detrimental to the interests of the citizens.

Charles L. Kurtz, president of the Columbus Company, told the Senate committee on cities, by which the bill was reported for passage, that enactment of the Atwood bill would handicap the company in its effort to refinance itself; that investors will cease to buy securities if informed that all franchises are to end in a few years, and that the company would face uncertainty in getting a new grant in 1926.

Indiana Company Sells Stock Direct to Public

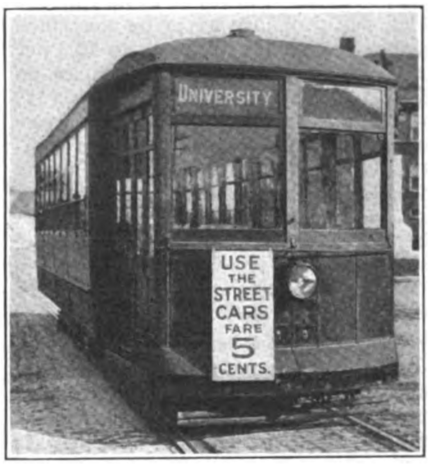
Some time ago Harry Reid, president of the Interstate Public Service Company, Indianapolis, Ind., decided to offer an issue of the 7 per cent prior lien stock to patrons of the interurban gas and light properties operated by the company. In commenting on the success of the offering Mr. Reid said:

> In spite of the fact that the money market has been described as tight, and stocks and bonds generally have not been absorbed as rapidly as in normal times we have sold approximately $500,000 of our 7 per cent prior lien stock. The people of this State have money to invest and will put it in sound, profitable investments.
>
> Our company naturally is pleased to find that its customers have enough faith in it to place some of their savings on surplus funds with us. It makes them partners in the enterprise. It seems to me that this partnership relation will be beneficial both to the company and to its patrons. The public utility business is really the people's business, anyhow, and the closer the relationship between the companies and the people the better it will be for both.

The Interstate Company handled this issue through its own employees, selling the stock at par at its branch offices.

1920 a Profitable Year in Charlottesville

The Charlottesville & Albemarle Railway, operating in Charlottesville, Va., was one of the few public utility companies operating railways as a part of their system that paid both preferred and common stock dividends in 1920. This is favorable indeed in view of the fact that the company is still operating on a 5-cent fare on its 3.5 mile line. With the hope of costs decreasing it was decided to continue at the old rate, and make every effort to increase patronage. The accompanying illustration shows the company's appeal for new patrons. The railway's report for the year just ended is also good in view of the fact that lighting and power rates have only been increased to cover the rise in the cost of coal. During the year $30,925 was spent for permanent improvements, the largest expense being for two combustion Engineering Corporation's heavy duty type "E" automatic stokers. The income statement for the past two years follows:



BIDDING FOR TRAFFIC IN CHARLOTTESVILLE

INCOME ACCOUNT — CHARLOTTESVILLE & ALBEMARLE RAILWAY

Item	1920	1919	Per Cent Change
Operating Revenues:			
Railway	$60,226	$50,957	18.2
Light and power	138,003	102,054	35.2
Total	$198,229	$153,011	29.5
Operating Expenses:			
Railway	$42,755	$35,977	18.8
Light and power	67,999	43,183	57.6
Depreciation	20,000	....	....
Total	$130,754	$79;160	65.3
Net revenue from operation	$67,475	$73,851	— 8.6
Non-operating income	634	761	—16.7
Gross income	$68,109	$74,612	— 8.7
Fixed charges	35,499	33,115	7.2
Net corporate income	$32,610	$41,497	—21.4
Dividends on pf. stk.	8,589	8,589	......
Dividends on cm. stk.	15,000	25,000	—40.0
Surplus	$9,021	$79,08	14.1

Net Income of $103,736 in East St. Louis

A 4 per cent dividend, totaling $77,600, has been declared by the East St. Louis (Ill.) Railway on the company's capital stock of $1,940,000, according to an announcement by W. H. Sawyer, president of the company. This is the largest dividend the company has voted in several years. The road is controlled by the East St. Louis & Suburban Railway.

A financial statement presented at the annual meeting and made public by Mr. Sawyer shows that the net income of the East St. Louis Railway during 1920 was $103,736. The balance remaining after the payment of the 4 per cent dividend will be added to the credit balance of the company, making the total $235,514. The statement follows:

INCOME ACCOUNT OF THE EAST ST. LOUIS RAILWAY

Operating revenues		$1,182,704
Operating expenses, depreciation, etc.		941,051
		$241,653
Taxes		45,000
Operating income		$196,653
Deductions:		
Interest on bonds	$98,470.00	
Miscellaneous interest, discounts, etc.	3,422.28	
		101,892
		$94,760
Non-operating income		8,975
Net income		$103,736

According to Mr. Sawyer the operating income of the company was approximately the figure that the Illinois Public Utilities Commission had fixed, the losses for the first few months of the year before the 8-cent fare became effective having been made up in the closing months. The commission had placed $195,000 as a fair income for the East St. Louis Railway after paying operating expenses, depreciation, power and other rentals.

This is the first time that a statement of this kind has been made public. Mr. Sawyer said that he expected the revenues of the company in 1921 would be in the neighborhood of last year's total, pointing out that the recent cut the Public Utilities Commission has ordered in fare would probably result in showing an increase the first part of the year over the corresponding period of 1920, but that the closing months would see a reduction as compared with the previous year.

New Interurban Contracts Being Negotiated

Wilfred Cann, street railway commissioner, and Frank R. Coates, president of the Community Traction Company, Toledo, Ohio, conferred with twenty representatives of interurbans entering the city in a preliminary meeting on Feb. 12 in the matter of new contracts for use of city tracks at Toledo.

The Milner ordinance provides that the interurbans could use the streets on the terms of old contracts only until new ones could be negotiated. The contracts are subject to arbitration.

The Toledo & Western Railroad, through its receivers, has asked the Public Utilities Commission to allow it to take Toledo off its tariff and substitute West Toledo for it, so that fare changes within the city limits could be adjusted to local conditions without the filing of a new petition and tariff every time the fare changed in the city limits. The company seeks in the petition to make its city fare agree with the 6-cent rate of the Community Traction Company, by March 14.

It is thought that this will be the course of action of practically all of the interurban lines entering the city. They will be regulated by tariff only to the city limits and then by contract adopt the city fares to agree with those set in the Milner ordinance.

The Toledo, Ottawa Beach & Northern Railway, one of the remaining Doherty lines at Toledo, has also filed a tariff making its city fare agree with the Community lines and increasing its fare to Toledo Beach, Mich., by 5 cents.

Financial News Notes

Back Coupons and Interest Paid.—Jan. 1, 1921, coupons on the New Orleans Railway & Light Company, general mortgage 4½ per cent bonds will be paid on and after March 31, 1921, upon presentation at the office of the New York Trust Company, N. Y., or the Hibernia Bank & Trust Company, New Orleans, La. In addition to the face amount of the coupons 28 cents interest thereon will be paid.

Sales of Roads Under Foreclosure Directed.—Judge Cummings at Sunbury, Pa., on March 18 directed the sale of the Sunbury & Selinsgrove Electric Railroad, the Sunbury, Milton & Lewisburg Railroad and the Chillisquaque Connecting Railroad, which have been in receivers' hands for more than seven years. The order of sale of the three properties was made to satisfy mortgage bond claims of more than $600,000, upon which interest is in default.

Valuation Protested.—A hearing to determine the validity of the valuation of the property of the Fargo-Moorhead Street Railway, Fargo, N. D., as ascertained by the State Railroad Commission, will be held on April 18. Notice of the hearing was filed with the City Commission on March 16 by the State Railroad Commission. According to this notice the railway recently protested against the valuation of its property as fixed by the commission.

Fewer Passengers in Toledo.—According to Street Railway Commissioner Cann there were 5,000 fewer daily electric railway passengers in Toledo, Ohio, in the month of March. He believes the decrease is due to the industrial depression which is now beginning to have its effect in the supply of ready money citizens have on hand. The Community Traction Company will report a deficit for March, it is estimated, of more than $75,000 as compared with a deficit of $58,000 for the previous month.

Appeal of City for Co-receiver Denied.—Declaring that if he later considers it advisable to appoint a co-receiver to represent the city's interest he will do so, Judge H. H. Watkins, at Anderson, S. C., on March 19 announced that he will leave the affairs of the South Carolina Light, Power & Railway Company, Spartanburg, S. C., temporarily at least, in the hands of George B. Tripp, vice-president and general manager of the company, and J. B. Lee, a director of the corporation, who were appointed receivers on Feb. 17.

Cable Cars Put on a Car-Mile Basis.—The United Railroads, San Francisco, Cal., has about 14 miles of cable railroad which will probably never be electrified because the grades range up to 19.8 per cent. In figuring up the earnings on this cable system, it is interesting to note that the cable cars show average earnings per car mile of 47 cents compared with 36 cents for the electric lines, but on the basis of car-hour earnings, the cable lines average $3.26 whereas the electric lines average $3.35. The explanation lies in the fact that the cable lines operate over comparatively short routes at slow speeds, averaging only about 6½ m.p.h.

Berkshire Company Faces Receivership.—Receivership for the Berkshire Street Railway, Pittsfield, Mass., is inevitable unless legislative relief is granted immediately, L. S. Storrs, vice-president of the company, told the legislative committee on street railways sitting in Pittsfield. The road operates 75 miles of tracks in Berkshire County. The New York, New Haven & Hartford Railroad, which owns stock, has put $6,000,000 in the property. According to the figures presented by Mr. Storrs the company's deficit last year was $100,000 and it now owes $94,000 for taxes, $40,000 for fuel and other essentials and has only $15,000 on hand. The parent company is willing to sell the property at a state appraised valuation and have it run by trustees like the Boston Elevated Railway.

Only $42,265 Earned to Meet Charges.—The Dallas (Tex.) Railway reports a gross income of $262,675 for the month of February, 1921, while the operating revenue for the same period was $220,410, not including interest on bonds, stocks, notes, commissions or discounts on loans or costs of raising money, rental on the Oak Cliff lines owned by the Northern Texas Traction Company, or dividends on stocks, which leaves a balance earned for return on the investment of $42,265. These figures are given in the financial statement submitted to the supervisor of public utilities covering the month of February and the forty-one months under which the company has been operating under the present franchise. The earnings of the company are set forth in detail in a statement which has been published in all the newspapers of Dallas as a display advertisement.

Property of United Railroads Sold.—The United Railroads, San Francisco, Cal., was sold to Frank D. Madison, attorney for the reorganization commottee, at receiver's sale on March 21 for $7,000,000. Mr. Madison, representing the committee, which consists of Frank B. Anderson, William H. Crocker, Herbert Fleishhacker, E. S. Heller and John D. McKee, submitted the only bid. The sale practically completes the long labors of the reorganization committee. Mr. Madison said after the sale that only about 2 per cent of the United Railroads 4s remained undeposited, and that practically all the Sutter Street Railroad & Omnibus Cable Railway bondholders had agreed to the reorganization plan. The successor company will be known as the Market Street Railway. The terms of the reorganization have been reviewed at length previously in the ELECTRIC RAILWAY JOURNAL.

City Protests Expenses of Receivership.—Formal objections to the inclusion of receivership expenses in the cost of the New York Municipal Railway Corporation under its contract with the city have been filed by Transit Construction Commissioner John H. Delaney with Receiver Lindley M. Garrison and also with Daniel L. Turner, chief engineer to the Transit Construction Commission, whose duty it is to determine the propriety of construction costs. Up to Dec. 31, 1920, the receivership expenses aggregated $472,380, of which $274,035 was allotted to the rapid transit lines and the remainder to the surface lines which do not come under the contract with the city. The commissioner objects especially to the inclusion of the compensation and allowances for disbursements by the receiver which amounted to $174,999 and to similar payments for his solicitor Karl M. Owen, $7,945.

Return of Equipment Sought.—The General Electric Company has become one of the intervenors in the Des Moines (Ia.) City Railway case. It demands $68,466 from the railway. The suit is brought to intervene in the action by the North American Construction Company. The company seeks to protect its investment in equipment which it has furnished to the Des Moines City Railway. The action is based upon sixteen promissory notes and five contracts signed by officers of the Des Moines City Railway during 1918. In its petition the General Electric Company asks that the federal court recognize the ownership of the equipment in the General Electric Company because of stipulations to that effect in the contract between that company and the railway. If the money is not paid within sixty days the General Electric Company asks a court order directing the Des Moines City Railway to return the equipment.

Traffic and Transportation

Mr. Dana Talks on Spreads

Boston Elevated Railway Explains to Men Difficulty of Eight Hours in Ten

The bulletin for March of the Boston Elevated Railway to its men is devoted to the question of spreads. The four previous bulletins of the company to its men cover principally the questions of earnings and expenses of the property for the previous months.

The question of spread came up on the property through a legislative bill (later abandoned) calling for eight hours in ten. The Boston Elevated schedules are made up on the eight-hour basis, but under the "cover" system, as described by Mr. Dana in an article on page 647 of the issue of this paper for Oct. 2, 1920.

The text of the March bulletin is reproduced below with the diagram which accompanied it:

> Operation during the month of February resulted in income exceeding expenses by $2,887.29.
>
> The severe storm of the twentieth made the problem more difficult but will in no way affect our determination to meet the outstanding deficit by July 1, 1921.
>
> The present working conditions on this railway are probably not equalled on any railway in this country. In view of the fact that an 8 in 10-hour law has been suggested it is of value to study its effect upon the problem of providing street railway transportation.

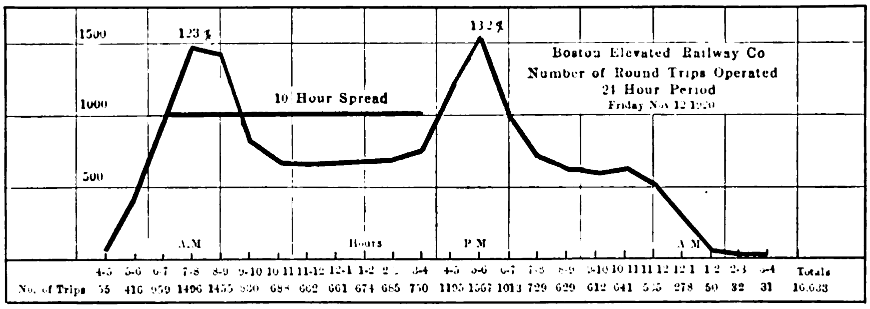


DIAGRAM IN CIRCULAR ISSUED BY BOSTON ELEVATED

> The accompanying diagram shows the number of trips operated on this system during each hour of the day.
>
> At the present time car service men complete their work with outside hours as follows:
>
> | | |
> |---|---|
> | 27% within 8 hours | 78% within 12 hours |
> | 33% within 9 hours | 88% within 13 hours |
> | 58% within 10 hours | 100% within 14 hours |
> | 71% within 11 hours | |
>
> This arrangement, in addition to an eight-hour guarantee which amounts to time not actually required in service, to $600,000 per year, permits all trips being arranged in runs, and the small per cent required to cover both rush hour peaks meets the service requirements of our business.
>
> The line drawn across the chart represents a ten-hour spread and indicates clearly that men operating morning rush hour trips would not be available for afternoon rush hour trips, and consequently more men would be required.
>
> It would require 1,300 more men to operate the system under such a restriction of outside time, and cost the car riders over two millions of dollars.
>
> If the eight-hour guarantee remained under such a plan the new men could only be of actual service one-fourth of their time, and the balance of the time would constitute a heavy burden upon the car riders.
>
> If the guarantee were not continued men who could only secure one-fourth of a day's work could not be held in the service, and a constant change of personnel would occur, which would likewise be a severe burden upon the car riders.
>
> We are co-operating in the common interests of the car riders, and ought to be familiar with facts such as these.
>
> Co-operation means securing all the revenue, avoiding accidents, being considerate of car riders, helping one another, conserving supplies and materials and not wasting time.

Eight-Cent Rate Temporary Solution

The existing rate of fare in the District of Columbia—8 cents, or four tokens for 30 cents—was ordered continued until Aug. 31 by the Public Utilities Commission in an opinion handed down on March 28. Efforts have been made to secure a reduction in the rate of fare. The Capital Traction Company did not ask for a continuation of the existing fare, but stated that a return to the 5-cent fare would not allow it a fair return. It was shown, evidently to the satisfaction of the commission, that the Washington Railway & Electric Company could not secure a proper return on less than the existing rate.

The commission apparently hopes Congress will pass the necessary legislation to permit the merging into a single organization of the two traction companies and the Potomac Electric Power Company.

Extraordinary Service and Extraordinary Mayor

In announcing his candidacy for renomination to the office he has filled for the last three years Mayor Charles R. Hunter of Terre Haute, Ind., told of things accomplished during his term of office. Among these points was the following:

> The traction company did its part toward making the necessary repairs along the line of its tracks, except for a strip along Wabash Avenue, which will be attended to this spring. * * * Although our people may not realize it we have as good a street car system as there is to be found in the country, and in the face of raising of fares all over the country our people ride at 5 cents. In other cities the fare has been advanced to 7, 8, 9 and 10 cents. Our people save thousands of dollars every year on fares alone.

Twenty per Cent Advance

Utah Road Allowed New Rates, but Refused Return on Appreciation in Value

One-way passenger fares on the Salt Lake & Utah Railroad, the "Orem Road," between Salt Lake City and Payson, Utah, are permitted to be increased 20 per cent by the Public Utilities Commission of Utah in a decision handed down on March 18.

COMMUTATION NOT INCREASED

Round-trip tickets, for which a 20 per cent increase was asked, are permitted to be increased 1.8 per cent of one-way fare. One thousand mile books are increased from 2¼ cents to 2½ cents a mile. No increase is allowed in 500-mile books, commutation tickets or school tickets. The application of the company was filed on Nov. 24, 1920. In it the company asked for a flat increase of 20 per cent on all its rates.

The Orem line at the hearing set up that its actual construction costs, incurred from 1913 to 1917, showed a book value of the property of $4,823,096. It sought to capitalize appreciations in value which have occurred during the war period. These, it was claimed, would enhance the value of the road by approximately 75 per cent, or $3,239,675. The company further sought to include in its investment $1,300,864 as "developmental cost," thus asserting the right to a fair return on a total cost of $9,363,635, as compared with the book value of the property of considerably less than $5,000,000.

WAR TIME VALUATION NOT ACCEPTED

These claims of the company the commission dismissed with the following comment:

> The commission is not inclined to accept in full a valuation based upon the maxims of war prices applied to property that was constructed and placed in operation before the war prices took effect. This is not intended to exclude consideration of such prices. On the contrary present reproduction cost undoubtedly is one element entering into the present fair value of property, but it is only one element and not necessarily controlling.
>
> Nor does the commission, in passing upon the question here involved, accept at this time as final the statement of book values presented by the petitioner as hereinbefore referred to. Such reference to the figures as has been made is intended merely to indicate that the financial condition of the petitioner is such that under this petition and for the purpose of passing upon the question involved it is not necessary to enter minutely into a consideration of the construction costs.

It was shown that the company had been unable to set up any depreciation reserve for the reason that the net income has not been sufficient to provide for depreciation on all of the property, and that heavy maintenance demands must be met by the railroad company within the next few years from current revenue.

Calculated on the 1920 volume of business it is estimated by the commission that the advances granted will increase the gross revenue of the company by $6,000 a month. This is a sum about 20 per cent less than the increase asked by the railroad in its petition.

Electric and Steam Lines Before I. C. C.

Common Issue Made by Railroads in Missouri and Kansas to Prevent Rate Discriminations

The Joplin & Pittsburg Railway, the Kansas City, Kaw Valley & Western Railway and the Arkansas Valley Interurban Railway have asked the Interstate Commerce Commission to adjust their intrastate rates to the interstate basis, and to join the electric road interests with those of steam railroads now pending before the commission. The cases were heard before an examiner of the Interstate Commerce Commission at Topeka on March 24. There will be a final hearing at Washington during April.

IN the case now coming from Kansas careful preparation has been made to establish all the facts in such a way that the analogy between electric and steam road circumstances may be plain. The situation has vital interest for the several electric railways in the Kansas City district, since neither the Missouri nor the Kansas State Commission has raised intrastate steam road rates to coincide with interstate rates fixed by the Interstate Commission.

PARALLELS STEAM RAILWAY CASE

The fact that Clyde Taylor, who prepared the present case for the Joplin & Pittsburg Railway, is also representing the Kansas City, Kaw Valley & Western Railway, has provided a valuable element in the construction of principles of interstate service by electric interurbans. The lines and service of the former are largely interstate; while the lines of the latter are intrastate, but its service largely interstate.

The third party to the present proceedings is the Arkansas Valley Interurban Railway, operating electric lines serving Wichita, Newton and Hutchinson, all within the State of Kansas.

The proceedings relative to the petition of the Joplin & Pittsburg Railway offer the broadest picture of the claim of electric roads to Interstate Commerce Commission intervention. This company operates 104 miles of standard gage road, the chief terminals being Joplin, in Missouri, and Pittsburg, in Kansas. It transports freight and passengers both in state and interstate commerce, files its tariffs with the state and federal commissions, has joint tariffs with the principal trunk lines, competes in both interstate and intrastate passenger and freight business with the Frisco, Southern, Missouri Pacific and Katy railroads. Its situation is therefore exactly the same as that of steam railroads whose intrastate rates, when discriminatory, the Interstate Commerce Commission adjusts in view of interstate rates.

The passenger rate of this company, in Kansas, was increased on March 4, 1920, to 3 cents per mile, and in Missouri was increased on Aug. 1, 1920, to 3 cents per mile. On Sept. 24, 1920, the company filed a passenger rate schedule of 3.6 cents per mile on interstate traffic with the Interstate Commerce Commission, and collected this rate on interstate passenger traffic thereafter. The present proceedings pertain chiefly to passenger rates, but the freight rate discriminations are also displayed. On Aug. 26, 1920, the interstate freight rates were advanced on this road 35 per cent, and on Nov. 1, 1920, the Kansas freight rate advanced 30 per cent.

When the time came to seek the intervention of the Interstate Commerce Commission concerning readjustment of state rates, it was necessary to show (1) that the intrastate rates were discriminatory, and (2) that the interstate rates, the higher, were reasonable.

The electric line's passenger rate of 3.6 cents was the result of a schedule without hearing upon its reasonableness and hence it did not constitute *prima facie* evidence that the interstate rate was reasonable. While it might appear upon the face of the evidence, therefore, that there was discrimination because of different intrastate and interstate rates, there was need to show definitely that the adverse discrimination was due to inequity of the state rates.

ROAD'S VALUATION STUDIED

The first steps in the present matter, therefore, were similar to those in rate hearings. Before the examiner in Topeka, were brought reports and evidences of the road's valuation, costs of operation and earnings. The low net earnings under the 3-cent intrastate rates were demonstrated, and the increase of earnings on interstate business under the higher interstate rate were also shown. The displays demonstrated that over the period during which the 3.6-cent interstate rates prevailed, the company's net earnings on interstate passenger business were small—much below fair return on approved valuation.

It was shown also that had the rates within Kansas and Missouri been equal to interstate rates during the whole period the returns net, would have been inadequate—assuming that the higher rate would not have reduced patronage. This evidence demonstrated the fairness and indeed the necessity of a 3.6-cent rate for intra and interstate traffic, and directly upheld the premise that the 3.6 interstate rate was reasonable. The evidence as to discrimination, therefore, put the burden of the discrimination on the unjustly low state rate. Many instances were advanced to show discrimination. Mr. Taylor proved that not only does the difference between the intrastate and interstate passenger rates cause discrimination against interstate business, but it enables the actual interstate passenger to defeat, in part, the interstate rate.

The electric railways are, in these proceedings, coming before the Interstate Commerce Commission on exactly the same footing as steam roads. Indeed, the whole subject now is presented as one matter, the electric and the steam lines being associated in the presentation. Attorneys for the two classes of transportation are cooperating and jointly preparing the cases and the issues are joined before the commission in the effort to secure a needed adjustment of rates for railroads, whether electric or steam, in cases where discrimination exists and is shown to exist. The proceedings are entitled "in the discrimination of Kansas intrastate passenger and freight rates and charges as against interstate rates and charges," I. C. C. No. 11916.

Fare Increase Suspended

New Jersey Road Must Quit Unless Adequate Relief Is Secured Through Increased Rates

Proposed collection of 10-cent fares in 142 municipalities in which the Public Service Railway operates in New Jersey was suspended on March 29, for a further period of three months by the new Public Utility Commission. This action was taken after Thomas N. McCarter, president of the Public Service Corporation, had testified before the commission that unless adequate relief is provided by increased revenues the Public Service Railway must go out of business. Mr. McCarter said:

> Public Service Railway would have been in the hands of a receiver long ago but for the fact that its stock is held by Public Service Corporation, which has been paying its deficit and keeping it alive. At the end of last year when the railway presented its application for increased rates, the situation had become most acute. The company's funds and credit had been exhausted and Public Service Corporation, in justice to its other underlying companies (Public Service Gas and Public Service Electric) was no longer in position "to hold the bag."

When the hearing began on March 29 Governor Edwards had not yet signed the bill passed the night before in the Senate giving the new commission power to suspend increased rates for a further period of three months. Therefore, the board was confronted by the alternative of terminating the hearing within three days or permitting the increase to become effective automatically. Governor Edwards, however, signed the bill during the afternoon, whereupon the board continued the previous order of suspension, which expired on April 1, and adjourned the hearing until April 7 when it will be resumed in Newark.

Mr. McCarter was the only witness examined. He said the actual loss sustained by the railway, during the last three years, including the shortage in the depreciation account fixed by the board, amounted to $3,700,000. He contended that instead of allowing $800,000 a year for depreciation the amount should be not less than $1,200,000. The company, he said, should expend immediately $2,000,000, representing the accrued shortage in its renewal account plus the whole sum allowed for depreciation for the present year.

Public Service Railway, Mr. McCarter said, carried 363,000,000 cash paying passengers last year. He estimated that with a 10-cent fare this number would be decreased by 50,000,000 during the present year.

As estimated by Mr. McCarter the cost of operation for 1921, including $1,200,000 for current amortization and $600,000 in part payment of the shortage in depreciation, will amount to $30,000,000. He estimated that a 10-cent fare will yield a revenue of $31,000,000. He explained that experience has shown a 40 per cent increase in rates results in a 15 per cent increase in revenue due to the fact that rate increases decrease the number of riders.

With jitney competition eliminated Mr. McCarter thought it would be possible to exist with a 10-cent fare for casual riders, including a free transfer, and an 8⅓-cent ticket fare.

Mr. McCarter said that since 1917 wages have increased from $6,250,000 to $13,500,000; the cost of coal from $3.50 to $8.25 a ton delivered at the power station; taxes were raised $2,700,000 last year with a further increase in prospect, and steel rails have practically doubled in price. These four big items, he said, tell the story.

One-Man Cars in Syracuse and Utica

One-man cars have been adopted for use by the New York State Railways on its Utica and Syracuse lines as a retrenchment policy, pending the granting of a fare increase by the Public Service Commission, for both cities. The one-man operation has been adopted on diverse types of cars, the first attempt to change the system being made on the Blandina Street line in Utica, a light traffic line, where single-truck cars had always been used. The single-truck cars were continued in operation, passengers entering by the front door and paying fares upon entrance.

Finding that this policy was successful and met with the co-operation of the public the South Street and Eagle Street lines in Utica were changed to one-man operation. Peter Witt model and J. G. Brill pay-as-you-enter type cars were used on these lines, passengers entering by the front door only.

In Utica passengers outbound from the downtown districts, pay as they leave while passengers inbound pay as they enter. Thus far such a policy has met with success. B. N. Tilton, vice-president and general manager of the concern, states that the one-man cars have been put on to stay.

In Syracuse the one-man cars were introduced on the Green Street line, a route lightly patronized where single-truck cars are operated. Five of the Syracuse city lines are designated for early conversion into one-man type service cars. Several of the lines are to be consolidated while one will be re-routed to make a shorter route in response to the petitions of patrons.

Transportation News Notes

New Transfer System Postponed.—The new transfer system on the Los Angeles (Cal.) Railway planned to be put into effect on April 3 has been postponed until May 1. The details of the transfer scheme were given in the ELECTRIC RAILWAY JOURNAL issue of March 19.

Needs Increased Fares.—The Southern Pacific Company has filed application with the Public Service Commission for permission to increase fares on its Oregon lines in the cities of Salem, Eugene, Springfield and West Linn. Advances sufficient to yield a 7 per cent return on the investment are asked.

Wants Seven Cents a Zone.—The Frankford, Tacony & Holmesburg Railway, Philadelphia, at a recent hearing before Public Service Commissioner Clement, petitioned for a 7-cent zone fare. The company alleges that it will not be able to continue service between Frankford and Torresdale unless a fare increase is permitted.

Complaint Against Six-Cent Fare Dismissed.—The Public Service Commission at Harrisburg has established a valuation of $1,300,000 for the properties of the Shamokin & Mount Carmel Transit Company, which operates in Mount Carmel, Pa., and has dismissed complaints against a 6-cent fare established in 1918. Subsequently the War Labor Board allowed a 7-cent fare.

Fare Rise Suspended.—The Public Service Commission has suspended until July 16 the 10-cent fare schedule sought by the St. Joseph Railway, Light & Power Company, St. Joseph, Mo. The advance was to have gone into effect on March 18. The present rate of two fares for 13 cents will remain in force unless in the meantime the commission should decide favorably on the railway's application.

Jitneys Barred Outside City.—As a result of a new law passed in the recent Legislature no stage lines or jitneys can be operated outside the city of Spokane, Wash., without a certificate of necessity issued by the State Public Service Commission. Stage lines now in operation within the city are not included in the new ruling. Jitneys were ruled off the streets of Spokane almost three years ago.

Jitney Business Thrives.—During the past few months several jitney buses have started operating along the principal streets in Evansville, Ind. For several years there was only one bus in the city. It was run from Main Street to Washington Avenue. Now in addition to the regular jitneys several buses meet the factory workers and haul them to their homes. The large number of jitneys now in operation is due largely to the fact that so many men out of employment find this a way of making a fair living.

Fare Increase Suspended.—The Board of Public Utility Commission has notified the Trenton & Mercer County Traction Corporation, Trenton, N. J., that it cannot put the proposed 10-cent fare into effect until May 28, unless the board in the meantime favorably disposes of the company's application, which has been pending since November. This company will make application to the Supreme Court for a review of the suspension order and the judicial determination of the right of the utility board to grant a suspension for six months.

Council Rejects Six-Cent Fare.—The City Council of Akron, Ohio, has denied the petition of the Northern Ohio Traction & Light Company for a flat 6-cent cash fare. The traction company forwarded a communication to the Council recently stating that it was losing money on a 5-cent fare, the rate now in effect on the city lines. The emergency 5-cent cash fare ordinance passed by the Council expires on April 1. The company has indicated it wants a 7-cent cash fare from April 1 until a new franchise for the city lines is passed by the council and accepted by the company.

Non-Stop Interurban Service Advertised.—The Puget Sound Electric Railway, operating an electric interurban between Seattle and Tacoma, Wash., has undertaken a campaign of advertising in both Seattle and Tacoma daily newspapers, calling attention to the "Interurban Flier," non-stop between the two cities, starting on March 21, with round-trip fare of $1. The advertisements urge that shoppers in both cities watch the daily advertising of merchants in the local papers, and plan their purchases accordingly. The company is making a strong effort to build up this "Shoppers' Special Train," and to increase traffic between the two cities.

Power Rates Too High.—At a recent hearing on the Dallas Railway's application for a 7-cent fare it was brought out that the railway would have made more than its 7 per cent return during the last six months of 1920 if fuel oil had been bought at its present price of $1.50 a bbl. In connection with its power rates the Board of Commissioners has requested the Dallas Power & Light Company to appear at a meeting to consider power rates now in effect and the proposed new schedule which the light company has declared it will charge the Dallas Railway in the future. The Mayor has requested a full expense report from the railway showing what return the company probably will make in 1921 on a 6-cent fare and what return on a 7-cent fare. He has said that everything will be done to expedite the hearings of both utilities so that the city may reach a decision in the near future.

Personal Mention

J. P. Pulliam, President

Railway Executive Chosen to Head Wisconsin Electrical Association for Ensuing Year

J. P. Pulliam, who for several years has served as secretary of the Wisconsin Electrical Association, was elected president at the annual meeting in Milwaukee on March 24. Mr. Pulliam takes the place of W. C. Lounsbury, general manager of the Superior Water, Light & Power Company, Superior, Wis. Mr. Pulliam is vice-president of the Wisconsin Public Service Company, of the Evanston (Ill.) Railway, and vice-president and general manager of the Wisconsin Railway, Light & Power Company.

Mr. Pulliam became connected with the electric railway field after a number of years' experience in steam railway work with the Louisville Southern Railway at Louisville, Ky., and with the Choctaw & Oklahoma Railway Company at Shawnee, Okla. Later he engaged in commercial pursuits for a year and then served as trainmaster for the Grand Rapids, Grand Haven & Muskegon Railway for three years. He left that company to become superintendent of the Winnebago Traction Company, Oshkosh, Wis.

When the Wisconsin Electric Railway purchased the Winnebago Traction Company in 1908 Mr. Pulliam served the former company and the Eastern Wisconsin Railway & Light Company as general superintendent. He was later given a similar position with the same company in Fond du Lac, Wis. In 1917 he was elected vice-president and placed in charge of the operation of the Wisconsin Public Service Company, continuing in this position to date.

John Whitsell Assumes Managership of Winnipeg Railway

John Whitsell, whose appointment as operating manager of the Winnipeg (Man.) Electric Railway was announced in the ELECTRIC RAILWAY JOURNAL a short time ago, assumed his new duties on March 15.

He began his career in the electric railway industry in 1891 when he entered the car service department of the Sioux City Traction Company, Iowa, now known as the Sioux City Service Company. In 1897 Mr. Whitsell went to work for the Suburban Railroad, Chicago, as a shopman, later advancing to master mechanic, and then to superintendent in 1900. In 1912 he became superintendent of equipment and general superintendent of transportation of the County Traction Company, Chicago, which, the following year, was combined with the Suburban Railroad to make the Chicago & West Towns Railway, of which he became general superintendent. In May, 1920, he was made general superintendent of the Chicago & Interurban Traction Company, which position he left to go to Winnipeg.

V. B. Phillips, Consultant

Assistant to Vice-President of Cleveland Railways Joins Mr. Crecelius in Engineering Firm

Victor B. Phillips has resigned as assistant to the vice-president and as acting superintendent of power of the Cleveland (Ohio) Railway to become associated with L. P. Crecelius in the firm of Crecelius & Phillips, consulting, constructing and operating engineers. The resignation of Mr. Crecelius as superintendent of power of the Cleveland Railways was announced in these columns on Jan. 22.

V. B. PHILLIPS

Mr. Phillips has been associated with the Cleveland Railway since 1911. He is a graduate of Cornell University with the degree of mechanical engineer.

Immediately after the outbreak of the war Mr. Phillips joined the army and served with the rank of captain in the 113th Engineers. After the armistice he was attached to the American Commission to negotiate peace, first in connection with the valuation of war damages, and later with Bernard M. Baruch, economic adviser to the commission. From April to September, 1919, Mr. Phillips served with the United States Liquidation Commission in Paris and had charge of disposing of surplus army stocks.

At the present time he is serving as expert on the American Committee on Electrolysis and is a member of the engineering executive committee of the National Safety Council. Papers and articles by Mr. Phillips on electric railway and power subjects have appeared frequently in society transactions and in the technical journals.

The firm of Crecelius & Phillips will engage in general engineering practice. At the present time the firm is acting as engineers for several electric railway and public utility companies.

Promotions on Interurban

H. G. Hardin Made Superintendent and H. A. Otis His Assistant on Chicago Road

Harry G. Hardin and Harold A. Otis have been appointed general superintendent and assistant general superintendent, respectively, of the Chicago & Interurban Traction Company, Chicago, upon the order of Britton I. Budd, president of the company. Mr. Hardin has been with the elevated railways in Chicago for nearly twenty years, having begun this service on Oct. 4, 1901, as a trainman with the Metropolitan West Side Elevated Railway. During the following ten years he worked up through the train and yard service and in 1911 was appointed superintendent of transportation of the Chicago & Oak Park Elevated Railroad. He served in this capacity until April, 1920, when he was brought into the main office of the elevated companies as an assistant to M. J. Feron, general superintendent of transportation. He served in this office until his recent appointment in immediate charge of the Chicago & Interurban Traction Company, an interurban line connecting Chicago with Kankakee, Ill.

Mr. Otis began his work with the railways as a night electrician for the South Side Elevated Railroad after his graduation in 1912 from the electrical engineering department of the University of Illinois. In September of that year he was transferred to the office of superintendent of equipment of the several elevated railways. He has been engaged in the engineering and operating department since that time, his jurisdiction in mechanical matters having been extended lately to include the Chicago-Kankakee interurban.

N. H. Brown Resigns from New Orleans Railways

Nelson H. Brown, superintendent of transportation of the New Orleans Railway & Light Company, New Orleans, La., has resigned and A. B. Paterson has been appointed acting general superintendent in his stead. Mr. Paterson comes from Meridian, Miss., and became identified with the New Orleans Railway & Light Company last July as special engineer for General Manager A. L. Kempster. He was formerly with the Henry L. Doherty interests and has had about seventeen years' experience in the public utility business.

Mr. Brown went to New Orleans from Buffalo, where he was general superintendent of the International Railway. He has had an extensive experience in railway service, having been connected previously with the street railways of Syracuse, Worcester and Albany.

H. M. Platt has recently been appointed editor of the N. E. L. A. *Bulletin* and assistant to the director of publicity. Mr. Platt was at one time on the editorial staff of the ELECTRIC RAILWAY JOURNAL, having previously been in the business department of the McGraw Publishing Company as a field representative on several of its publications.

F. E. Schornstein, formerly local manager at Red Wood, Minn., of the Wisconsin-Minnesota Light & Power Company, has been made district manager for the same company at Eau Claire, Wis., in charge of the local street railway system in Eau Claire and Chippawa Falls and the interurban line connecting these two cities and Altoona.

V. Chisholm has resigned his position as superintendent of the railway department of the Knox County Electric Company, Rockland, Me., after having served thirty years in the railway department of that company. Charles E. Gregory, who has been in charge of the operation of the power station equipment at Rockland for several years, has been appointed to fill the vacancy. Mr. Gregory will have full charge of the railway department and power station equipment.

R. L. Ellis has been appointed manager of the Miami Beach Electric Company's new $250,000 plant which furnishes Miami Beach, Fla., with its light, and power for both industrial and railway use. Mr. Ellis was formerly with the Birmingham Railway, Light & Power Company, Birmingham, Ala., and previous to that was connected with the Selma (Ala.) Electric Railway Company. After making a complete survey of the transportation situation, Mr. Ellis has recommended a ten-minute schedule between Miami and Miami Beach and has taken steps toward the procuring of additional rolling stock to permit maintaining that schedule and building up adequate and efficient service.

Benjamin F. Cleaves, chairman of the Maine Public Utilities Commission since its establishment in 1914, has tendered his resignation to take up the management of the Associated Industries of Maine, with headquarters at Augusta. Chairman Cleaves is a native of Waterboro, Me., and was graduated from the Biddeford High School in 1885. He read law in the offices of Hamilton & Haley, was admitted to the bar in 1892, and practiced law at Biddeford thenceforth, ultimately becoming a member of the firm of Cleaves, Waterhouse & Emery. With the establishment of the Maine commission he sought to create an understanding between the utilities, the public and the commission which was peculiarly adapted to the conditions prevalent in Maine and which has borne fruit in a regulation of marked breadth of view, straightforward action and a sane and sympathetic realization of the problems of public utility service and financing.

Statue to Railway Founder

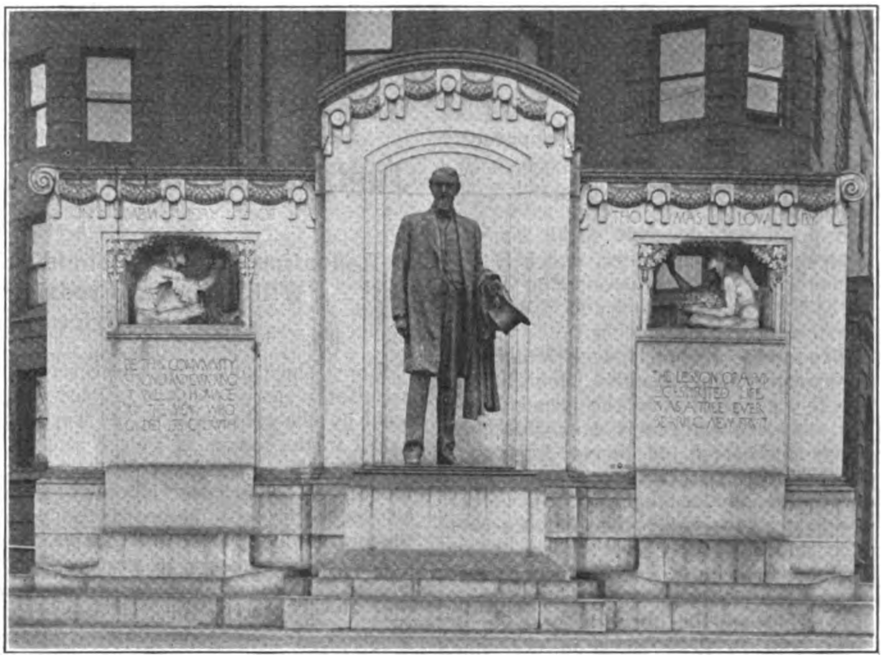
Permanent Memorial Erected in Minneapolis to Founder of Present Twin City Rapid Transit Company

Few electric railway men who knew Thomas Lowry of Minneapolis, Minn., and cherish recollections of him are perhaps acquainted with the fact that a monument by Karl Bitter has been erected to the memory of the founder of the Twin City Rapid Transit Company. The bronze statue stands in Virginia Triangle, Minneapolis, at the intersection of Hennepin and Lyndale Avenues. It was unveiled on Aug. 18, 1915, and presented to the city by the Lowry Memorial Association, formed among Mr. Lowry's friends and associates shortly after his death on Feb. 4, 1909.

"Tom" Lowry was born Feb. 27, 1843, on a farm in Logan County, Ill. He was admitted to the bar in 1867. The same year he opened a law office in Minneapolis and a few years later was made judge of the Hennepin County Court of Common Pleas. After the panic of 1873 Mr. Lowry turned his attention to the struggling street railway in Minneapolis, with which he was afterward continuously connected, at first as vice-president and later, when the systems in Minneapolis and St. Paul were consolidated, as president. In the early days of the American Electric Railway Association Mr. Lowry took a very active interest in its affairs and in 1890 was elected president of the association.

He was very popular, especially in the Twin Cities. One of the newspapers in eulogy of Mr. Lowry said editorially: "No man envied his wealth, for it was well earned and well spent. If for nothing else, he was remarkable for making his traction company the most popular institution in two great cities. To this his own unaffected modesty and high personal character largely contributed."

The accompanying illustration of the memorial is published through the courtesy of the Minneapolis *Journal*.



MEMORIAL TO "TOM" LOWRY, FOUNDER OF TWIN CITY RAPID TRANSIT

Obituary

J. B. Robbins, at one time superintendent of the Chattanooga Railway & Light Company, Chattanooga, Tenn., died on March 16 in St. Paul, Minn. Mr. Robbins began business as a railroad contractor. He was also a business associate of the late C. G. Goodrich, president of the Twin City Rapid Transit Company. Mr. Robbins was born in Kentucky in 1862.

Benjamin B. Lawrence, mining engineer and a director of the Washington Water Power Company, Spokane, Wash., and of other corporations, is dead. Mr. Lawrence was graduated from the School of Mines, Columbia University, in 1878. He went West and engaged in gold and silver mining in the Gilpin district of Colorado. Returning to New York he established an office as a consulting engineer.

Samuel T. Murdock of Indianapolis, who has been prominent in the promotion of Indiana's traction lines, died on March 21 after a week's illness. Mr. Murdock was secretary of both the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind. He was also interested in the Union Traction Company of Indiana, Anderson, and had been recently named as a director of that company. Mr. Murdock was fifty-three years old.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Good Supply of Track Bolts, Nuts and Spikes

Prices Are from Twenty to Forty per Cent Below Peak—Buying Mostly for Repairs

Producers of railroad spikes, bolts and nuts have accumulated a reasonable reserve supply sufficient to make deliveries of all standard material from stock, but there is a growing tendency to curtail production. This is natural in view of the light demand, and large jobbers who sell to railroads are also keeping their supplies down as low as they consistently can. Although there seems to be nothing tangible on which to base expectations of still greater price declines in this line producers report that consumers are apparently entertaining such hopes. The reduction from peak prices of spikes and bolts to date has been considerable, ranging from about 20 to 40 per cent with different companies, and in a representative instance amounting to $12 to $15 a ton on spikes and $20 to $30 per ton on bolts and nuts.

Producers are of course hopeful of improvement in demand, though they see few signs of it in the present market. Steam railroads last fall gave every indication of heavy buying of track material this spring and in fact did enter the market in fair volume the first of the year. This buying came nearly all at one time, however, and then petered out. For the past six weeks there has been very little activity either in the foreign or domestic field, and to date there is not much indication that railways will do more than repair roadbeds this year.

The current base price of track bolts and nuts is about 5 cents in car lots and 6 cents in lesser quantities, while standard railroad spikes are 3.65 cents and 4.65 cents by the same differentiation.

Immediate Deliveries of Track Tools

Manufacturers Differ Over Prospect for Demand Improving—Stocks Held to Low Levels

In view of present market conditions both manufacturers and jobbers of track tools such as picks, shovels, etc., report that they are keeping stocks low. Some companies, however, still have a considerable supply of high-priced goods on their hands on which it has been necessary to take a loss. In general immediate deliveries are made. The reduction from peak prices reported by different producers ranges from 10 to 30 per cent, though for some time the market has held steady. There seems to be some feeling of uneasiness in the trade regarding steel quotations, and the possibility of lower prices is perhaps a contributing factor in keeping both stocks and buying at low levels.

Some producers are optimistic over a return of fairly good business before the year is out, others are not. On the one hand it is pointed out that through such factors as the payment of money owed by the government to steam roads, the inauguration of wage cuts and higher rates for many electric lines, some hope of improvement is offered. On the other hand, it is stated that railways in general apparently have no money, that steam roads have in large part already expended the payments that are anticipated from the government and that the last half of the year will be too late for manufacturers in this line to receive good orders.

Thus far in 1921 it seems that the railroads of the country, both steam and electric, are going to buy only such track tools as are actually needed for necessary repairs, and even these in light volume. The foreign market is off, too, though there is quite a strong demand reported from South America and a large potential demand undoubtedly exists in Europe. Exchange rates are prohibitive as they affect the placing of orders in this country, however, and foreign competition is keen.

Justification of Present Prices Up to Manufacturer, Say Railways

Reduction of Prices Would Stimulate Buying, Is General View—Willingness of Producers to Take Losses on Stocks of High-Priced Material Is Questioned

Since the views of representative manufacturers of electric railway equipment on the subject of prices were published in the issues of Feb. 5 and 12, a number of letters have been received from electric railway officials. These letters differ with some of the points that producers make and present new evidence, in addition to that contained in the Feb. 26 number, as to how traction companies generally regard the question of price reductions on electric railway material.

The general tenor of the replies of the electric railways that were heard from appears to be that the burden of proof should rest upon the manufacturer as to why greater reductions in price are not made. There is also a decided feeling in many cases that prices of railway material are still out of line with lowered costs. Such items as steel, ties, wheels, track material, paints and varnish, overhead material, air and electrical car equipment, power station and substation equipment are among the things that are specifically mentioned.

Unwillingness of some manufacturers to take losses upon stocks of high-priced material is mentioned by more than one electric railway as the cause of prices being maintained. An official of a representative Middle-Western traction company believes that manufacturers in this field made large profits during the period of rising prices and now, if well organized, should be able to take some losses. This is the only way to relieve the present stagnated condition of the market, he thinks. A purchasing agent for another property corroborates this view and states that electric railways are trying to place as near normal orders as they can where manufacturers have shown a willingness to take losses the same as has been done in other industries. Where producers have held out for prevailing high prices, however, this company is following a policy of curtailing purchases to the lowest possible level commensurate with absolute needs.

The practice of maintaining railway equipment prices where possible finds some defense from the president of an electric railway in the East, however. This official believes in a policy of buyer versus seller, and if a manufacturer is able to obtain business sees no reason why prices should philanthropically be cut. He goes on to say, however, that some manufacturers are undoubtedly displaying poor judgment in not passing lowered costs on to the consumer as a means of increasing present low demand.

Manufacturers in general, as stated in previous issues, have questioned whether price cutting would stimulate buying to any extent. The buying end of the industry is by no means agreed over this point either, but judging by reports received from several representative railway officials greater buying would undoubtedly follow decided price reductions.

These men report that extensions in some instances are being held back awaiting lowered costs, and that consumers would stock more goods instead of buying from hand to mouth if prices really represented a profitable investment.

The most common explanation offered by manufacturers for maintaining prices is that freight charges and labor costs preclude reductions. The purchasing department of a Western electric railway disputes this view on the ground that freight charges are unimportant in the final price of most products and that labor cost, even where no reduction in wages has been made, is now less, due to greater efficiency of workmen.

Another important factor in prices of railway material today is probably overhead expenses. In this connection the general manager of a large traction company in the north-central section points out that the industry at present is largely over-factoried because of wartime expansion. Some of these factories must be closed down or converted to other industries, he thinks, for to continue full operation means 100 per cent overhead on a limited output.

Victoria, Australia, Asks Tenders on Steel Poles and Copper Cable

Tenders are invited by the State Electricity Commission of Victoria, Australia, for 600 steel poles for carrying three, three-phase, 22,000-volt feeder cables and two metallic return telephone circuits, and for 250 miles of hard-drawn copper cable for the Morwell power scheme. Copies of specification No. 47, covering the steel poles, and specification No. 66, covering the copper cable, have been forwarded by A. W. Ferrin, trade commissioner, and have been placed on sale at the Bureau of Foreign and Domestic Commerce, district offices, 734 Custom House, New York City, and 1424 First National Bank Building, Chicago. Tenders must be received at the office of the Electricity Commission, Melbourne, Australia, by May 31, 1921.

South African Railways Request Bids

In connection with the forthcoming electrification of the Durban to Pietermaritzburg and Cape Town to Simons Town lines of the South African Government Railways, the High Commissioner for the Union of South Africa has invited tenders for rolling stock, electrical equipment, etc.

Copper Market Tending Higher

Steps leading to a further drastic cut in copper production have now been taken, and as a result several large mines have closed down entirely. This factor in the market, together with the firm price stand that has all along been taken by large producers, has brought about a decidedly firmer tone. Prices have advanced about ¼ cent since last week's report, and the minimum quotation for prompt delivery is now 12.50 cents. Large producers are still holding to prices of 12.75 to 13 cents per pound for copper delivered over the next two to three months and are reported to have made sales at these figures.

Consumers have apparently decided that nothing is to be gained by holding off longer from covering their needs, and as a result domestic buying interest is decidedly greater. Whether this is but a temporary condition it is, of course, yet too early to say. The most recent companies to suspend operations temporarily are the Anaconda, Utah, Ray, Chino and Nevada Consolidated copper mining companies.

Rolling Stock

The Androscoggin and Kennebec Railway Company, Lewiston, Me., is building in its own shops one 40-ft. steel underframe, motor, gravel flat car.

Brooklyn (N. Y.) Rapid Transit Company is considering with a number of car builders and the Safety Car Devices Company the adaptation of several hundred double-track cars on its surface lines to the safety car principle.

The Monmouth County Electric Company, Red Bank, N. J., has purchased four fifteen-bench, double-truck, open summer cars and six double-truck closed cars. The above rolling stock, it is announced, is not new but in first-class condition and will replace single-truck cars now in use.

Track and Roadway

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway is planning to make an extension from Cloverdale to Blaine. An extension is also contemplated from Huntington, B. C., to Bellingham, Wash.

Denver (Col.) Tramway.—The Denver Tramway will begin improving its lines as a result of the recent fare advance. New steel rails will be laid

NEW YORK METAL MARKET PRICES

	Mar. 2, 1921	Mar. 30, 1921
Copper ingots, cents per lb	12.50	12.75
Copper wire base, cents per lb	15.25	15.00
Lead, cents per lb	4.00	4.10
Nickel, cents per lb	41.00	41.00
Zinc, cents per lb	5.10	5.15
Tin, cents per lb	29.37	29.37
Aluminum, 98 to 99 per cent, cents per lb	28.00	28.00

OLD METAL PRICES—NEW YORK

	Mar. 2, 1921	Mar 30, 1921
Heavy copper, cents per lb	10.25 to 10.50	9.50 to 10.25
Light copper, cents per lb	8.00 to 8.25	7.00 to 8.50
Heavy brass, cents per lb	6 00 to 6 50	5.50 to 5.75
Zinc, old scrap, cents per lb	3.00 to 3.12	2.87 to 3.00
Yellow brass, cents per lb	4.00 to 4.25	4.00 to 4.25
Lead, heavy, cents per lb	3.25 to 3.50	3.25 to 3.50
Steel car axles, Chicago, per net ton	16.50 to 17.00	14.50 to 15.00
Old car wheels, Chicago, per gross ton	18.00 to 18.50	13.50 to 14.00
Steel rails (short) Chicago, per gross ton	15.50 to 16.00	12.00 to 12.50
Steel rails (rerolling), Chicago, gross ton	15.00 to 15.50	12.00 to 12.50
Machine shop turnings, Chicago, net ton	6.50 to 7.00	5.50 to 3.00

ELECTRIC RAILWAY MATERIAL PRICES

	Mar. 2, 1921	Mar. 30, 1921
Rubber-covered wire base, New York, cents per lb	16.50	16.50
Weatherproof wire base, New York, cents per lb	17.50	17.50
Standard Bessemer Steel Rails, per gross ton	45.00	45.00
Standard open hearth rails, per gross ton	47.00	47.00
T-rail, high (Shanghai), per gross ton, f.o.b. mill	.....	.....
Rails, girder (grooved), per gross ton, f.o.b. mill	.....	.....
Wire nails, Pittsburgh, cents per lb	3.10 to 3.25	3.00 to 3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.65	3.65
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb	6.00	6.00
Fish plates, cents per lb	2 75	2.75
Angle bars, cents per lb	2.75	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	5.50	5.00
Steel bars, Pittsburgh, cents per lb	2.00 to 2.35	2.00 to 2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	3.85 to 4.20	3.70 to 4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	4.80 to 5.25	4.55 to 5.25
Galvanized barbed wire, Pittsburgh, cents per lb	3.85 to 4.10	3.85 to 4.10
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70 to 3.95	3.70 tc 3.95
Car window glass (single strength), first three brackets, A quality, New York, discount*	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes, A quality), New York, discount	79%	79%
Waste, wool, cents per lb	11 to 17	11 to 17
Waste, cotton (100 lb. bale), cents per lb.		
White	9.00 to 14.00	9.00 tc 13.00
Colored	7.00 to 11.00	7.00 to 11.00
Asphalt, hot (150 tons minimum), per ton delivered	40.00	40.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	36.00	36.00
Asphalt, filler, per ton	36.00	36.00
Cement, New York, per bbl	4.10	3.50
Linseed oil (raw, 5 bbl. lots), New York, per gal	.72 to .73	.68 to .70
Linseed oil (boiled, 5 bbl. lots), New York, per gal	.74 to .75	.70 to .72
White lead (100 lb. keg), New York, cents per lb	.13	.13
Turpentine (bbl. lots), New York, per gal.	.57 to .59	.54

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* These prices are f.o.b. works, with boxing charges extra.

on the Stout and Kalamath Street lines to replace several blocks of old track which will be torn up.

St. Petersburg (Fla.) Railway.—The St. Petersburg City Commission has ordered an election to be held on April 19 to vote on a bond issue of $260,000 of which $65,000 of bonds will be issued to build an extension of the street railway, which is municipally owned, out First Street and a loop around by First Avenue. Citizens have pledged to buy the bonds at par if they can't be marketed otherwise.

Evansville, Ind. — Benjamin Bosse, Mayor of Evansville, Ind., assured a delegation of more than 400 people at a hearing a few days ago of his assistance in getting an extension of the car lines through Howell, a suburb of Evansville. The matter has been referred to the railroad committee of the Evansville City Council for action.

Indiana Public Service Corporation, Fort Wayne, Ind.—R. M. Feustel, president of the Indiana Public Service Corporation in securing permission to double track the line on Pontiac Street to the city limits has answered the objection that the street is too narrow. Mr. Feustel has stated that Pontiac Street is the only through street south of the railroad along which the line could be built and though the pavement is narrow there are possibilities of widening it and making it the logical thoroughfare east of Calhoun Street and south of Creighton Avenue.

Power Houses, Shops and Buildings

United Railways, St. Louis, Mo.—The United Railways is planning the building of four electric plants at a cost of $285,000.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Railway has completed a concrete and steel carhouse and shops.

Alabama Power Company, Montgomery, Ala.—The Public Service Commission has granted a certificate of necessity for the construction of a large power unit near Lock 12 on the Coosa River to the Alabama Power Company. The company has also received permission for the construction of a transmission line from Roanoke to Lafayette and another from Auburn to Tuskegee.

Indiana Service Corporation, Fort Wayne, Ind.—Power for the street cars in Fort Wayne, Ind., will be supplied from a new substation to be erected by the Indiana Service Corporattion at the corner of Melita and Webster Streets. The ground has been purchased and the preliminary work on the construction of the building is under way. The plant will be housed in a one-story brick building measuring 40 ft. by 80 ft. Motor generator sets will be removed from the company's main plant on Spy Run Avenue to the new station.

Laconia Street Railway, Laconia, New Hampshire.—The Laconia Street Railway expects within the next six months to purchase one 200-kw. synchronous motor-generator set.

Professional Notes

Louis T. Klauder has resigned as construction engineer of the Philadelphia Rapid Transit Company and has opened offices in the Pennsylvania Building, Philadelphia, as a consulting engineer specializing in power plant design and construction.

C. G. Young, consulting engineer, has organized the C. G. Young Company, Inc., to act as consulting engineers. The field of the new company will include, among other engineering work, that of the investigation and placing of new and fundamental inventions and processes, as well as to assist manufacturers to take on new lines of manufacture which would be of profit to them. Mr. Young's experience in domestic and foreign fields extends over thirty years, and a considerable part of this time he has been engaged in public utility engineering. The headquarters of the company will be at 501 Fifth Avenue.

Trade Notes

The Waterbury Battery Company, Waterbury, Conn., announces the election of E. E. Hudson as president and Francis T. Reeves, treasurer.

Austin Machinery Corporation, manufacturer of concrete mixing machines, etc., lost several buildings by fire at its Winthrop Harbor, Ill., plant on March 22. The damage will not in any way interfere with production and prompt delivery of its products, however, it is announced, as the company's plants at Muskegon, Mich., and Toledo, Ohio, are well equipped to care for customers.

Electrifying Rumanian Railroads.—The Bukarest government is considering the electrification of a number of its railroads. Large orders have already been placed in Germany, the Orenstein-Koppel Works alone having received orders to the amount of 90,000,000 marks. It is reported that additional orders will be placed in the near future.

Swedish Commission to Study Swiss Electrification.—Advices from Switzerland state that during the next few weeks a commission of foreign engineers will visit Switzerland for the purpose of studying the electrification of the Swiss railroads. The commission will be composed of three American and three Swedish engineers. Mr. Oefverholmen, the Director General of the Swedish State Railways, heads the commission. The foreign engineers will inspect the Gotthard and Lotshberg lines and the large new power stations on both of these lines.

The Refractories Manufacturers Association, at its annual meeting March 16 to 18, in New York, re-elected the following officers: J. D. Ramsey, Elk Fire Brick Company, St. Marys, Pa., president; J. L. Green, Laclede-Christy Clay Products Company, St. Louis, Mo., vice-president; C. C. Edmunds, McLain Fire Brick Company, Pittsburgh, treasurer; F. W. Donahoe, 840 Oliver Building, Pittsburgh, the association's executive offices, secretary; E. M. Durant of the Pacific Clay Products Company, Los Angeles, Frank J. Helwig of the Standard Fire Brick Company, Pueblo, Col., and C. E. Kapitzky of the Federal Refractories Company, Cleveland, were elected to the executive committee.

The United States Rubber Export Company, 1790 Broadway, New York, as distribution unit of the United States Rubber Company in foreign fields, has new branches in process of being opened in Batavia, Java, as the Dutch East Indies branch, in Brussels, Belgium, and in Copenhagen, Denmark. A full line of electrical conductors, insulating friction tape and rubber splicing tape is to be carried in each branch, as is now carried in existing branches in Havana, Rio de Janeiro, Montevideo, Buenos Aires, Santiago de Chile, Manila, London, Madrid and Johnannesburg. Exclusive distributing arrangements are maintained in Mexico, Venezuela, Porto Rico, Barbados, Peru, Colombia, Bolivia and India, where stocks are also carried.

New Advertising Literature

Compressor. — The Griscom-Russell Company, 90 West St., New York City, has issued bulletin No. 350, describing the "G-R Regenerative Compressor."

Portable Instruments.—The Westinghouse Electric and Manufacturing Company is distributing leaflet No. A3501, describing its type PX portable instruments for general testing purposes.

Insulating Fabric. — A non-woven fabric sheet and tape for insulating purposes, "Voltape," has been developed by the Res-Pro Industries, Inc., 209 Washington Street, Boston.

Indicators and Gages. — The Bacharach Industrial Instrument Company, Homewood Station, Pittsburgh, is distributing pamphlet M, covering its engine indicators (Maihak type). Bulletin G describes its "Easy Read" manometers and gages.

Pump Governor. — Having acquired sole rights to manufacture and sell Ideal Pump Governors the Atlas Valve Company, 282 South Street, Newark, N. J. is now distributing its first bulletin, No. 1-A, edition No. 1, describing this governor.

Combustion Recorder.—Mono Corporation of America, New York City, has issued a bulletin describing its "Duplex Mono," which simultaneously records on one diagram both the surplus of air in process of combustion and the degree of incomplete combustion.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, April 9, 1921 *Number* 15

All Franchise Clauses Should Be Clearly Expressed

THE controversy now going on in Toronto over the interpretation of a clause in the franchise of the street railway company again calls attention to the necessity for careful drafting of such grants so that all their terms may be clear not only at the time of origin but at any date in the future. The Toronto franchise expires on Sept. 1 of this year, at which time the city hopes to exercise its privilege of taking over the property. Thirty years ago when the grant was accepted both parties to the deal probably understood all the provisions. As the time for agreeing on a purchase price draws near there is a division of opinion over the intent of several clauses bearing on valuation.

One of the clauses says that in determining a value the arbitrators are to consider only the value of the actual and tangible property necessary to the operation of the railways; also, that the arbitrators are to award only the value at the time of the arbitration, "having regard to the requirements of a railway of the best kind and system then in operation and applicable to the said city."

It is interesting to note that while this franchise was drafted some thirty years ago, both parties to the agreement then recognized the principle that payment should be made only for "property used and useful in the public service." Since that time many of the public utility laws in the United States have embodied the same principle, and thus in determining a valuation of a public service property some of the old contentions have been eliminated. The Toronto grant would appear clearly to exclude any claim for capitalization of franchise, good will or earning power.

Woolworthing the Car Ride in Beaver Valley

BY "WOOLWORTHING" the car ride, nothing more nor less is meant than the application of the practices made so successful by the late Frank W. Woolworth to electric railway merchandising by the sale to customers of articles in such sizes or quantities that they can be sold for a small and single coin. Such an example of Woolworthing is given by the experience of the Beaver Valley Traction Company, described in this issue under the heading "Adjusting the Fare to Length of Ride." To discuss the pros and cons is unnecessary, inasmuch as the article speaks for itself, but an outline of the situation that had to be faced may be helpful.

The Beaver Valley Traction Company, as its name implies, is a river valley railway. It is one of those long, shoestring roads serving a mixture of small towns and sparsely peopled country that is much more common in the United States than in countries which have been less liberal with electric railway promotion and building. In pre-war days it was a multiple-fare railway made up of 5-cent sections, but with a 4½-cent fare for the buyer of ticket books. First, the fares were brought closer to 5 cents flat. Later, the company "followed the crowd" by seeking increased revenue through a higher unit fare per section, this fare being successively 6 cents and 7 cents. These successive changes brought the company up squarely against the facts that its traffic was falling off and that it was not getting all the revenue hoped for and needed. From the railway checks of the traffic that it had (the passenger on the car) and of the traffic that it wanted (the rider in the automobile and pedestrian on the sidewalk), it turned out that more than half the actual and possible business was short haul. As a consequence, the management came to the conclusion that a shortening of the zones, the restoration of the 5-cent unit rate, the elimination of transfers on one route and the modification of transfers on another offered better prospects. Upon this change it superimposed a second one welcome to the short rider, namely, a shortening of headway from twenty to ten minutes on at least one line to date. The results have been all that could be expected, for the increase in traffic in the urban parts of the system has been great enough to produce more dollars than the longer ride at the higher fare.

The Problem of the Abandoned Line

THE report of the Massachusetts Department of Public Utilities on the subject of the support of electric railway lines in that State, reviewed elsewhere in this issue, is of interest outside as well as within Massachusetts as the report naturally includes a consideration of the question of abandoned lines. According to the report of the Massachusetts commission, in that state alone 371 miles of track have been abandoned up to the present time.

This condition existing in a state which has, from the earliest days of the industry, consistently applied strict regulation of all financing and operation shows clearly that there is something more than overcapitalization or mismanagement involved in the instance of these abandoned and poorly paying lines, in spite of the apparently unceasing clamor of political demagogues and would-be economists, whose chief stock in trade seems to be destructive rather than constructive criticism.

Although the Massachusetts report does not attempt any blanket recommendation for the resumption of service on all abandoned lines, it is at least constructive and reasonably optimistic. It clearly recognizes the economic fact that if a community is to have street car service somebody must meet the entire actual cost of that service, and it recommends that the individual community directly concerned devise the best means of meeting that cost, rather than resorting to state ownership or subsidy. At least it believes this plan should have a fair trial before any more extensive experiment be made in the direction of the State's assumption of the obligation. The probability of reduced wage scales and lower prices generally was apparently in the minds of the commissioners when they referred to possible future far-reaching economic changes which are likely to bring relief. The recommendation that the street railways be freed from all charges for construction and repair of streets and bridges and from the taxes intended to be in commutation of such charges would seem to be in line with sound public policy, and capable of relieving at least a part of the present strain.

The Massachusetts Department of Public Utilities has done wisely in refraining from attempting to specify particular lines which should be re-established and others which should not be. Presumably the people in the communities which have lost the service are best able to decide just how much they need the street railway after having done without it for a while or having tried some substitute methods of transportation. And if the legislation proposed by the department is acted upon by the Massachusetts Legislature, the people of that State will have at hand a means of preventing the discontinuance of any line, or the restoration of service on any line, by the simple but essential expedient of providing the necessary funds to keep it going.

Governor Miller Carries Through His Traction Reform

GOVERNOR MILLER of New York has had his way. One of his early official acts after taking office on Jan. 1 was to indicate to the legislators the need for constructive action looking particularly toward relief from the intolerable conditions into which war-time costs and the unbending attitude of the Hylan administration had thrown the railways in the greater city. Gradually as the purposes behind the Governor's special message became plain the opposition among the legislators dwindled until the only voices that remained to protest were those of the Democratic minority and the Socialists. Political strategy apparently dictated the course pursued by the Democrats. The Socialists of course, as ever, were the irreconcilables.

The bill that has become law is broad and sweeping in its powers, but no less so than would seem to be necessary if the regulatory bodies which it creates are to be permitted to function properly. On account of the investment of the city of New York in the present subways the cry has been raised by the opposition that the new measure is unconstitutional because it makes incumbent upon the city the acceptance of such proposals as may be evolved by the Transit Commission for New York City in laying down a plan for settlement there.

The bill does not provide a settlement; it merely creates a means whereby a settlement can be brought about. Until the commission has functioned and brought forth its plan it would seem that the opposition to the measure is merely tilting at windmills. The commission under its wide powers will have certain strong cards to play in the interest of the city, and it is not beyond the bounds of probability that the new body may evolve a plan of settlement under which the city will benefit no less materially than the companies.

Those who have assumed that the commission has been created by, for and in the interest of the corporations which it will regulate cast doubt on the motives of the Governor, indirectly charge with subservience all the legislators who voted for the measure and ignore all the evidence in the case. In arrogating to itself the sole right of defender of the city in the traction matter the Hylan administration assumes a rôle not altogether in keeping with its past performances. Many champions there are with no axes to grind who can be counted upon to come to the aid of the city if necessary, but they are content to remain impassive until the need shall become unmistakably evident that they should intervene.

The personnel of the commission is extremely important, probably more so than some of the law's provisions. Its announcement by the Governor is awaited with interest.

Should There Be an Exhibit This Year?

IT IS the time now when the association must decide whether it will hold an exhibit this year, and a questionnaire has been sent to manufacturer members asking their views on the subject. The circular is being sent at the request of a committee of manufacturers to whom President Gadsden has referred the matter. The position of the railways in this question is understood to be that if the manufacturers desire to make an exhibit they will be pleased to have one, but they consider the matter should be determined primarily by the manufacturing companies themselves. The latter have wisely decided to obtain a consensus of opinion, and the questions asked are whether the manufacturer members are in favor of holding an exhibit at Atlantic City this year, if the company will exhibit if such an exhibition is held, and if so how much space it will require. The letter mentions as reasons why the association might dispense with an exhibit this year the depression in business conditions and the fact that the proposition presented by the representatives of the pier at Atlantic City is considered unsatisfactory.

Considerable can be said both in favor of and against the plan of holding an exhibit. In favor of the plan, the principal arguments are probably as follows. An exhibit undoubtedly would attract a larger number of delegates to the convention than if there was no exhibit. This is especially true with reference to equipment men and others who do not travel around over the country so much as the higher officers and executives. To some manufacturers, particularly those making bulky exhibits, the annual exhibition is the most economical way by which this new equipment can be shown to a large number of railway men. With the exhibits and meetings on the pier, an unequaled opportunity is afforded to the attendants at the convention to make and renew acquaintances and discuss matters relating to the industry.

Among the positive arguments against the exhibit the most important undoubtedly is the large cost of transporting the exhibits to Atlantic City and renting the space there, and while the electric railway business may be in better condition than for some years past, the present business depression affects all manufacturers engaged in general business, and this includes of course most manufacturers of electric railway apparatus. There are, of course, precedents for the omission of the exhibit, as in 1915 on account of the exhibition at the San Francisco Fair, and in 1917 and 1918 on account of the war. In this connection it is argued by some that annual exhibits were justified in the early days of the industry when the exhibits were smaller and equipment was

Plan 3. Then existing fare zones, averaging 3 to 6 miles. Straight 10-cent zone fare, except that 15 cents would be charged for through passengers passing Junction Park. Fare in Riverview, Monaca and Sharon to be 5 cents without transfer.

Plan 4. Then existing fare zones, averaging 3 to 6 miles. Straight 8-cent zone fare, but with 5-cent non-transfer fare in Riverview, Monaca and Sharon; rest of routes, 8 cents per zone. Expected increase, 11.1 per cent.

Plan 5. Straight zone fare of 7.5 cents with new fare zones, averaging 2 to 3 miles. No transfers in Riverview and Monaca. Expected increase, 42.3 per cent.

Plan 6. Same as Plan 5 except for two shiftings in fare points at Beaver and Rochester. Expected increase, 44.9 per cent.

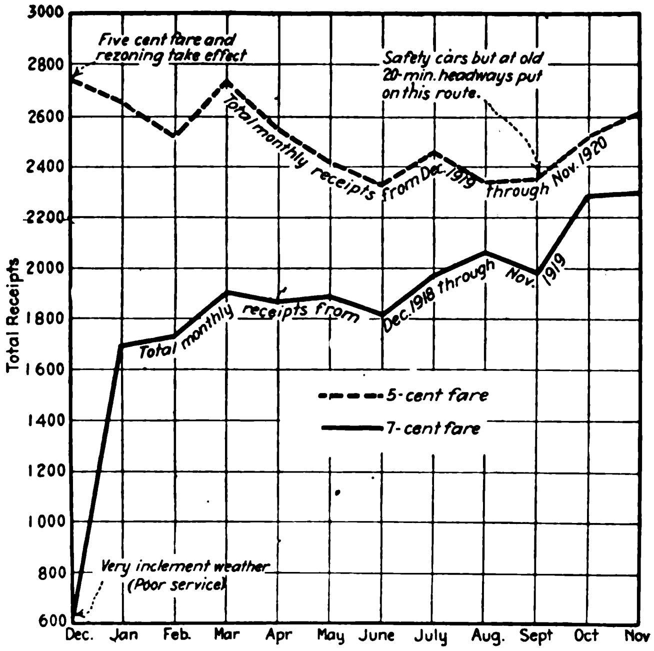
Plan 7. Five-cent zone fare with zones shortened to an average of 2 miles with transfer privileges continued. Expected increase, 12.52 per cent.

Plan 8, as proposed and adopted. Five-cent zone fare with zones averaging 2 miles as in Plan 8, but with transfers eliminated on the Monaca division and modified on the Riverview division. Expected increase, 19 per cent.

Plan 9 was a straight 10-cent fare with zones averaging 3 miles. The theoretical increase in revenue was figured to be 50 per cent.

EARLIER INCREASES SHOWED WISDOM OF KEEPING FIVE-CENT FARE ON SHORT LINES AT LEAST

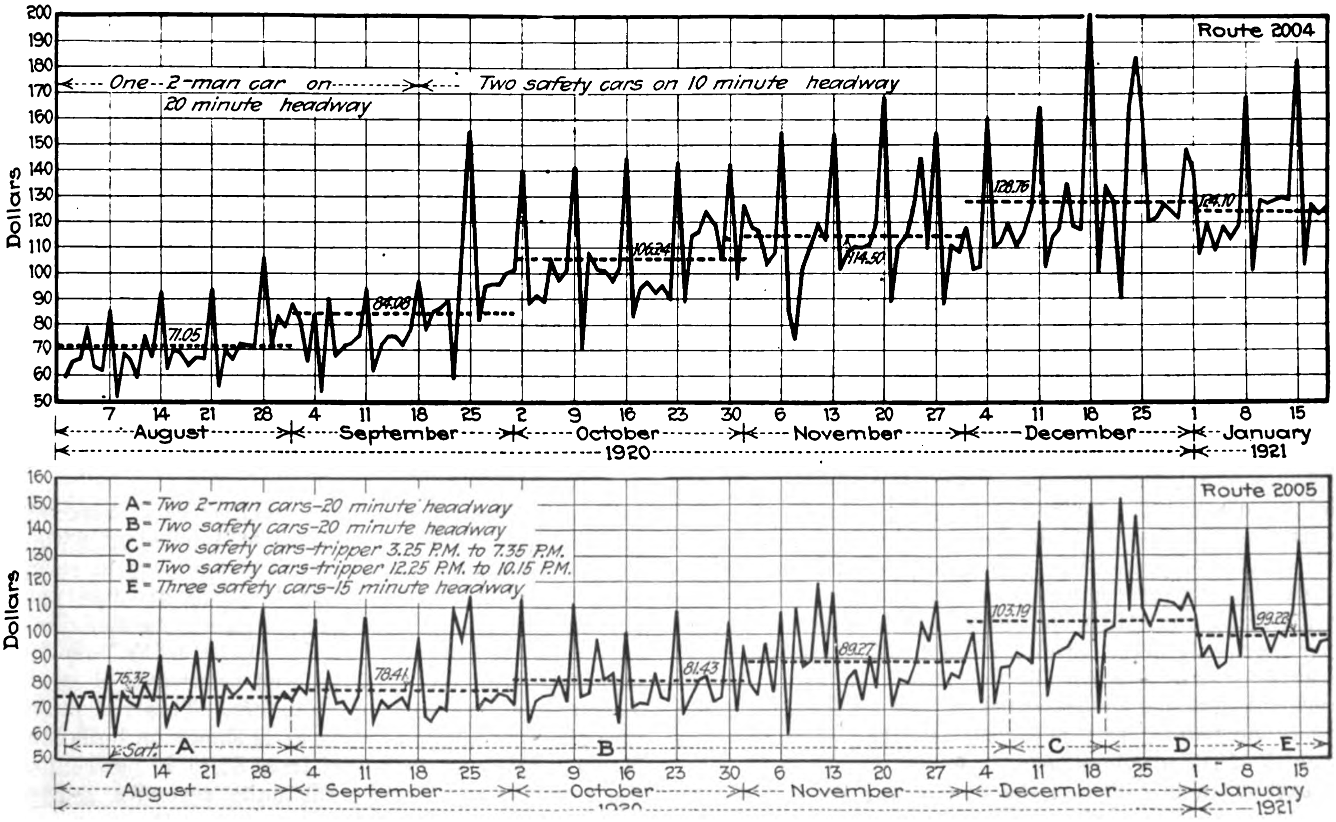
In coming to his deductions favoring short 5-cent zones, Mr. Boyce had two statistical bases to go by in addition to his intimate knowledge of the territory. The first of these bases was the traffic survey of Oct. 2, 1919, and the other the results which had followed the earlier fare increases.



RESULT OF SERVICE BETTERMENT ON ROUTE 2005, RIVERVIEW CROSSTOWN LINE, 2.7 MILES IN LENGTH, CONNECTING NEW BRIGHTON AND BEAVER FALLS FOR A 5-CENT FARE, WHEREAS THE MAIN LINE FARE IS 10 CENTS

The results of the traffic survey, segregated by the nine 7-cent zones, marked on the map showed clearly how dependent the company was on the short-haul riders. Analysis showed that more than 50 per cent of the passengers rode less than what are now two 5-cent zones.

A further increase in the base rate of fare which was then 7 cents might have been disastrous, due to traffic losses, whereas a shortening of the fare zone with



DAILY RECEIPTS ON TWO SINGLE-ZONE ROUTES FROM AUG. 1, 1920, TO JAN. 19, 1921, SHOWING HOW MORE FREQUENT SERVICE INCREASES PASSENGER REVENUES a corresponding reduction in the base rate might be advantageous in retaining the present riders and at the same time creating new traffic.

WHAT OCCURRED WITH EARLIER FARE CHANGES

The results from the earlier fare changes in the order of their occurrence follows:

First change—On Sept. 1, 1916, the labor tickets, so called, which provided a 10-cent ride for 5 cents during certain hours and the full fare tickets that had been sold in lots of 100 for $4.50 were abolished and a new ticket was put on sale at the rate of 21 for $1. Roughly speaking, the 4.5-cent zone fare ticket was succeeded by a 4.7-cent rate. No change was made in the cash fare, which still remained at 5 cents with free transfers, nor was any change made in the length of the fare zones. From a traffic standpoint the first month's operations compared with the previous month showed a gain in revenue zone passenger traffic of 2.22 per cent, although the revenues increased but 4.35 per cent.

Second change—On Jan. 26, 1918, the base rate of fare per zone was increased to 6 cents and all tickets abolished. No change was made in transfer privileges nor in zone lengths. For the property as a whole, the results of the first month's operation under this fare increase showed a 2.34 per cent loss in the number of revenue zone passengers carried but a gain in revenue of 14.95 per cent.

Third change—On Sept. 6, 1918, the zone base rate of fare was further increased to 7 cents. No change, however, was made in transfer privileges or zone limits. A comparison of the first month's operations with the previous month shows that again there was no appreciable change in the number of revenue zone passengers carried. The corresponding change in revenue was 10.58 per cent. Looked at in a different light, the company was carrying in September, 1918, daily an average of 25,523 revenue zone passengers at 7 cents per zone as against 21,445 prior to the first change in fares, Sept. 1, 1916. However, as there had been a 75 per cent increase in fare for a portion of the car riders in the same period the average daily receipts jumped from $1,032.54 to $1,339.89, or 29.8 per cent.

TABLE II—RESULTS OF TRAFFIC SURVEY BY ZONES

Zones	1	2	3	4	5	6	7	8	9	All
Passengers on	13,154	2,340	319	87	2	...	..	..	..	15,902
Passengers off	5,510	7,004	2,380	591	208	136	44	25	11	15,909
Total passengers	18,664	9,344	2,699	678	210	136	44	25	11	31,801

Total passengers boarding car within limits of Beaver Falls borough (Twenty-sixth Street to Beaver Falls-Brighton station) who:

Rode to Beaver	387
Rode from New Brighton to Beaver	241

Fourth change—On Dec. 1, 1919, the whole fare scheme was changed as already mentioned, and the length of the zones changed to approximately 2 miles with the base fare set at 5 cents. The immediate results were below expectations. The first month's operations, December, 1919, compared on an average daily basis with November, 1919, showed a gain in revenue of 4.58 per cent. January results were below December and February was slightly better than January. March, however, showed up more nearly the anticipated gain; in other words, 15.1 per cent over the corresponding month of the previous year.

Attention is called to the figures for April, 1920, as compared with April, 1919. The 5-cent fare evidently was creating new riders. The increase in zone passengers on the Beaver Valley Lines was 24.29 per cent and on the Pittsburgh & Beaver Lines was 27.56 per cent. Table III as well as the chart depict clearly the effect of the various fare changes as it influences traffic.

TABLE III—FISCAL AND TRAFFIC RESULTS OF FARE CHANGES, BEAVER VALLEY TRACTION COMPANY ONLY

Daily Averages

Date	Zone Fare	Revenue	Revenue Zone Fares	Transfer and Free Zone Fares	Total Zone Fares	Average Revenue per Car-Mile (Cents)
Aug. 1-31, 1916	(a) 5c	$1,033	21,445	4,807	26,252	28.9
Sept. 1-30, 1916	(d) 5c	1,078	21,923	4,613	26,536	30.0
Per cent change	0.0	+4.35	+2.22	—4.03	+1.08	+3.81
Dec. 26, 1917, to Jan. 25, 1918	( ) 5c	$913	18,911	2,806	21,717	......
Jan. 26, 1918, to Feb. 25, 1918	6c	1,049	18,468	3,203	21,671	......
Per cent change	+20.0	+14.95	—2.34	+14.18	—0.21	......
Aug. 6, 1918, to Sept. 5, 1918	6c	$1,212	20,519	4,382	24,901	......
Sept. 6, 1918, to Oct. 5, 1918	7c	1,340	20,523	4,030	24,553	......
Per cent change	+16.66	+10.58	0.00	+12.42	+14.00	......
Nov. 1, 1919 to Nov. 30, 1919 (c)	7c	1,637	23,420	4,380	28,800	39.8
Dec. 1, 1919, to Dec. 31, 1919 ( )	( ) 5c	1,712	34,455	2,945	37,400	41.1
Per cent change	—28.6	+4.58	+ 46.8	—30.4	+29.82	+3.27

(a) 4½-cent ticket and a two-zone labor ticket for 5 cents are also sold.
( ) 5-zone zones—2 miles average length.
(c) Figures include Pittsburgh & Beaver Street Railway.
(d) Reduced rate zone tickets sold twenty-one for $1.

HOW FARE INCREASES AFFECT THE SHORT HAUL TRAFFIC

A specific proof of the value of adhering to the 5-cent fare as a unit for a short-distance ride when the transfer can be practically eliminated is afforded by a study of the Monaca Route 2004 and the Riverview Crosstown Route 2005, which are respectively 1.5 miles and 2.7 miles long. Even on the latter line most of the riding is done within a haul of 1.25 to 1.5 miles, so that the combination of a twenty-minute headway and a more-than-nickel fare was too great a temptation to walk.

The graphs on pages 672 and 673 show daily and monthly revenues for both routes and are good indices of results obtained by reducing fares for building up short-haul traffic. Tables IV and V also give an idea of what high minimum fares mean on routes when the average length of ride is but little more than a mile.

On Route 2004—between Monaca and Rochester—where the bulk of the riding is one mile or less, the effect of the elimination of labor tickets and the 4½-cent zone ticket caused a loss of 10.52 per cent in total passengers and a 4.46 per cent in revenue. (Even a quarter of a cent increase in fare may loom big to the patron.) The change from 5-cent zones to 6-cent zones in 1918 showed a further decrease in the revenue passengers carried, but due to a 17.5 per cent increase in transfers collected, the traffic handled by the route increased 2.67 per cent and the 20 per cent increase in fare netted an increase of 10.03 per cent in revenue.

The 7-cent fare which became effective in September, 1918, caused losses in total traffic handled of 6.31 per cent, although an increase of 7.08 per cent in revenue was obtained. This loss, however, was greatest in the number of revenue zone passengers carried, which decreased 9.4 per cent. On Dec. 1, 1919, the 7-cent fare with free transfer privilege was reduced to a straight 5-cent zone fare without transfers. This reduction in fare alone stimulated riding as is shown on both charts. Monthly revenues increased from 35 to 40 per cent over the previous year, while the daily revenues showed a corresponding upward tendency from the day of the 5-cent fare. In September safety cars supplanted the

TABLE IV—EFFECT OF FARE INCREASES ON TRAFFIC—ROUTE 2004

Daily Averages

Date	Zone Fares	Revenue	Revenue Zone Fares	Transfer and Free Zone Fares	Total Zone Fares	Average Revenue per Car-Mile (Cents)
Aug. 1—31, 1916..	(a) 5c	$60.60	1,230	655	1,885	36.04
Sept. 1—30, 1916..	(b) 5c	57.90	1,160	527	1,687	34.71
Per cent change...	......	—4.46	—5.68	—19.58	—10.52	—3.15
Dec. 26, 1917 to Jan. 25, 1918....	(b) 5c	$51.69	1,035	349	1,384	......
Jan. 26, 1918 to Feb. 25, 1918....	6c	56.88	1,011	410	1,421	......
Per cent change...	+20.0	+10.03	—2.32	+17.5	+2.67	......
Aug. 6, 1918 to Sept. 5, 1918....	6c	$53.05	926	486	1,412	31.82
Sept. 6. 1918 to Oct. 5, 1918.....	7c	56.81	839	484	1,323	34.17
Per cent change...	+16.67	+7.08	—9.40	—0.50	—6.31	+7.37
Nov. 1—30, 1919..	7c	$76.60	1,101	522	1,623	46 51
Dec. 1—31, 1919..	5c	83.10	1,661	7	1,670	49 86
Per cent change...	—28.6	+8.48	+50.86	—98.66	+2.89	+7.20

(a) A 4½-cent and a two-zone labor ticket for 5 cents are also accepted for fare.
(b) Reduced rate zone tickets sold twenty-one for $1.

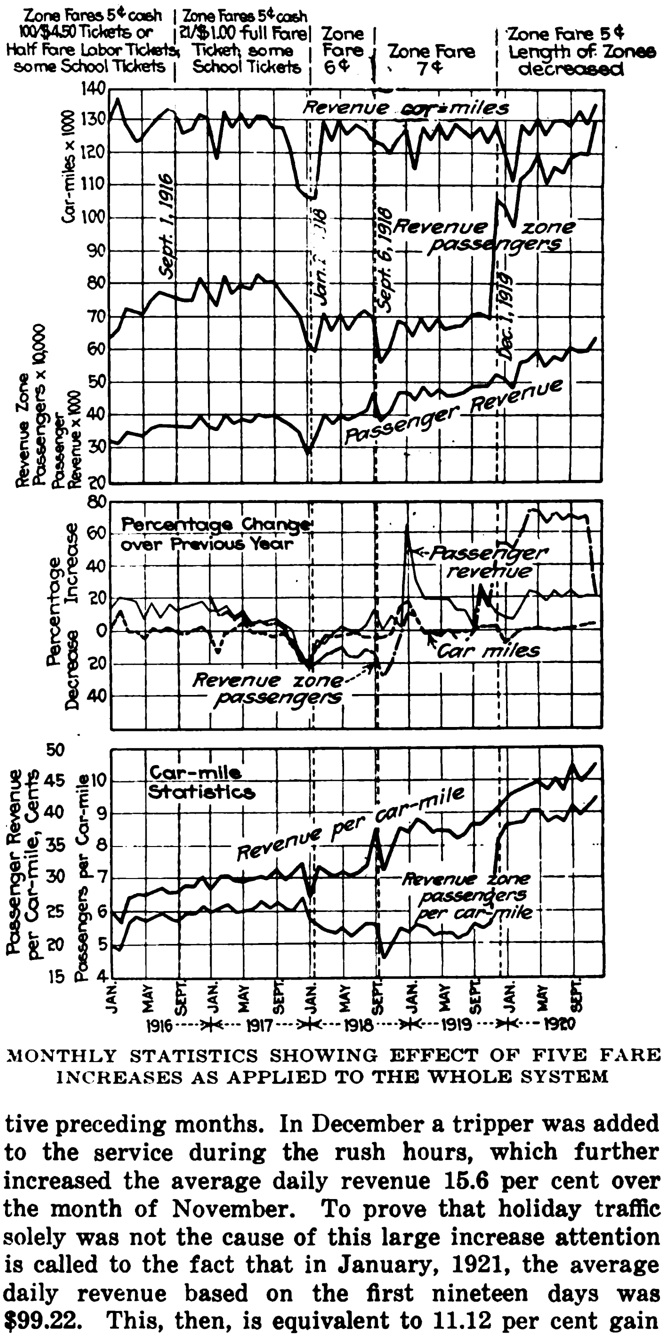
two-man cars, with the headway cut in half. This improved service still further increased the traffic so that revenues in October, 1920, the first whole month of safety car operation, were 51 per cent more than the previous year. In December, 1920, the business depression became a factor, due to the industries in the territory served laying off about 27 per cent of their forces. Nevertheless the frequent service in dull times brought more traffic than the longer headways in good times.

Route 2005, although called a crosstown line, is really a roundabout route between New Brighton and Beaver Falls, starting at about the middle of New Brighton (Fourteenth Street) and running to Beaver Falls via Eleventh Street, which is the chief business street of that town.

Similar figures are also given in Table V for Route 2005—the so-called Crosstown Riverview Line. A comparison of the results on these two routes shows conclusively that as fares are increased the traffic losses very often are such that the actual results are not as anticipated. In other words, compared with the traffic handled prior to any change in fares in 1916—and that during the 7-cent fare period—the loss in traffic amounts to 29.82 per cent on Route 2004 and to 22.62 per cent on 2005, while from the revenue standpoint on Route 2004 there is a loss of 6.26 per cent, and on Route 2005 the gain is but 1.14 per cent.

The increased revenue resulting on this route is due not only to the change in fare and improved service but to the fact that with the establishment of the 2-mile 5-cent zones the fare via the main line between New Brighton and Beaver Falls was made 10 cents, and but 5 cents via the roundabout or crosstown line. Thus for January, 1920, as shown on the graph, revenues had increased 56 per cent over the corresponding year, without any improvement being made in the service. This was equivalent to a gain of 95 per cent in traffic. Unfortunately this gain is not stable but decreased month by month until in June, 1920, when the gain over the preceding year was but 14 per cent. Safety car service was installed in September, 1920—with no change in headway. The effect on revenues was an increase of 4.1 per cent in September, 3.86 per cent in October and 9.62 per cent in November over the respective preceding months. In December a tripper was added to the service during the rush hours, which further increased the average daily revenue 15.6 per cent over the month of November. To prove that holiday traffic solely was not the cause of this large increase attention is called to the fact that in January, 1921, the average daily revenue based on the first nineteen days was $99.22. This, then, is equivalent to 11.12 per cent gain over November. However, in January three safety cars were operating on a fifteen-minute normal headway as against a base schedule of twenty minutes and fifteen minutes in the rush hour with trippers in November and December.

From the figures in Tables IV, V and VI it is evident



MONTHLY STATISTICS SHOWING EFFECT OF FIVE FARE INCREASES AS APPLIED TO THE WHOLE SYSTEM

TABLE V—SHOWING EFFECT OF FARE INCREASES ON TRAFFIC—ROUTE 2005

Daily Averages

Date	Zone Fares	Revenue	Revenue Zone Fares	Transfer and Free Zone Fares	Total Zone Fares	Average Revenue per Car-Mile (Cents)
Aug. 1-31, 1916...	(a) 5c	$54.32	1,103	187	1,290	18.71
Sept. 1-30, 1916...	(b) 5c	50.73	1,024	172	1,196	17.74
Per cent change...	......	—6.60	—7.17	—8.03	—7.28	—5.17
Dec. 26, 1917 to Jan. 25, 1918....	(b) 5c	$60.16	1,201	108	1,309	......
Jan. 26, 1918 to Feb. 25, 1918....	6c	64.43	1,033	95	1,128	......
Per cent change...	+20.0	+7.11	—13.98	—12.02	—13.82	......
Aug. 6, 1918 to Sept. 5, 1918....	6c	$57.77	981	160	1,141	19.96
Sept. 6, 1918 to Oct. 5, 1918.....	7c	54.94	835	163	998	18.77
Per cent change...	+16.67	—4.91	—17.5	+1.87	—12.55	—5.96
Nov. 1-30, 1919...	7c	$76.23	1 098	145	1,233	26 67
Dec. 1-31, 1919....	5c	84.25	1 769	77	1 840	30 59
Per cent change...	—28.6	+10.52	+61.11	—46.89	†49.2	+14.69

(a) A 4½-cent and a two-zone labor ticket for 5 cents are also accepted for fare.
(b) Reduced rate zone tickets sold twenty-one for $1.

TABLE VI—RESULTS UNDER FIVE-CENT ZONE FARE

Date	Zone Fare	Revenue	Revenue Zone Fares	Transfer and Free Zone Fares	Total Zone Passenger
Daily Averages—Route 2004					
Jan. 1920	5c	$86.11	1,726	None	1,726
Jan. 1919	7c	62.91	918	427	1,345
Per cent change	..	+36.9	+88.2	......	+28.22
Aug. 1920	5c	$71.05	1,430	None	1,430
Aug. 1919	7c	165.27	931	518	1,449
Per cent change	..	+8.86	+53.7	......	—1.27
Oct. 1920	5c	$106.24	2,125	None	2,125
Oct. 1919	7c	70.91	1,016	492	1,508
Per cent change	..	+49.8	+102.2	......	+29.0
Daily Averages—Route 2005					
Jan. 1920	5c	$85.80	1,716	101	1,817
Jan. 1919	7c	56.13	783	129	912
Per cent change	..	+53.0	+119.0	—21.65	+99.2
Aug. 1920	5c	$75.32	1,522	229	1,751
Aug. 1919	7c	66.61	953	150	1,103
Per cent change	..	+13.08	+59.7	+52.7	+58.6
Oct. 1920	5c	$81.43	1,621	64	1,685
Oct. 1919	7c	73.81	1,059	146	1,205
Per cent change	..	+10.34	+53.2	—56.2	+39.8

that for the short routes under consideration the 5-cent fare is bringing the largest amount of revenue from the largest number of patrons. The Beaver Valley 5-cent short-zone fare scheme was one that took the individual peculiarities of the different routes into consideration instead of applying some one blanket change and consequently the results have proved so gratifying. A significant phenomenon is that the losses in traffic during the various cash-rate increases occurred chiefly during the months of fair weather, and this fair weather traffic did not tend to come back. In other words, had the company gone to higher and higher cash fares its usefulness would have dwindled to the point of carrying only the compulsory maximum-distance rider.

As another example of this tendency it may be pointed out that on the Pittsburgh & Beaver Railway the winter increase, Jan. 26, 1918, from 5 cents to 6 cents, caused no diminution in traffic, whereas the summer change, Sept. 6, 1918, from 6 cents to 7 cents, caused so large a drop in traffic as to produce less revenue comparing the month before and the month after the change in rates.

TABLE VII—CHECKS OF BRIDGE TRAFFIC, BEAVER VALLEY TRACTION COMPANY

	Northbound					Southbound				
Tenth Street Bridge	Car		Auto	Truck	Foot	Car		Auto	Truck	Foot
Thursday, Sept. 4, 6:30 a.m. to 11 p.m.	361		1628	414	661	338		1746	371	692
Friday, Sept. 5, 6:30 a.m. to 10 p.m.	301		1607	509	759	367		2068	530	673
Bridgewater Bridge	Eastbound					Westbound				
Wednesday, Sept. 10, 6 a.m. to 10 p.m.	1678		1629	236	808	1599		1556	254	736
Thursday, Sept. 11, 6 a.m. to 9 p.m.	1454		1449	245	681	1346		1468	214	711
	Northbound					Southbound				
Monaca Bridge	Car	Jitney	Auto	Truck	Foot	Car	Jitney	Auto	Truck	Foot
Monday, Sept. 8, 6 a.m. to 10 p.m.	609	135	658	166	631	667	165	608	168	581
Tuesday, Sept. 9, 6 a.m. to 10 p.m.	626	168	644	152	561	676	151	685	146	544
Overgrade Bridge	Total Pedestrians Only									
Wednesday, Sept. 10, 6 a.m. to 11 p.m.	470									
Thursday, Sept. 11, 6 a.m. to 11 p.m.	550									

As a matter of both fairness and good business the company is willing to split the nickel for customers who have to pass through a short terminal zone. Thus on the 0.73-mile terminal zone between Sassafras Alley, Beaver and Ferry St., Vanport, only 2½ cents is charged, although the tariff calls for 5 cents. In addition to benefiting the passenger who has already paid for one or more 5-cent zones, the company is getting out a 5-cent round-trip ticket for local traffic. This particular stretch is to be paved next year and it will then become a more attractive residential section. The management, in its usual forehanded way, is doing its share to attract new residents by means of the 2.5-cent rate; and when the time is ripe it will give a 10-minute through service instead of turning back half the cars at Ferry Street, Vanport.

Another interesting possibility is that of the Overgrade Bridge between New Brighton and Beaver Falls. The company charges a 2-cent toll for walking over this privately-owned bridge but contemplates a 2½-cent car rate, as this might induce some riders to go on into the next 5-cent zone.

POTENTIAL CUSTOMERS FAR OUTNUMBER THE ACTUAL RIDERS

The foregoing data have demonstrated that the development of differential short-ride fares has increased both traffic and revenue on the system as a whole, and that the increase in service on the short routes have also been a factor in the same direction. The question that remains is: How many more riders can the railway obtain eventually if fares and service are right in the eyes of the public?

To this end several checks of pedestrian and automobile traffic have been made and changes noted in addition to the fluctuations in telephone traffic as noted hereinbefore. In a check made during 1919 at various bridges the thought-provoking figures totaled in Table VII were obtained.

The traffic check on the Tenth Street bridge between Beaver Falls and New Brighton showed that the pedestrian traffic was about double and the automobile passengers about five times the number of street cars users. Naturally, not all of these are street car prospects, but it will be admitted that here is something to work on! The traffic checks on the other bridges do not show up the street railway so badly, but here, too, there are possible customers for the electric railway.

The jitney traffic over the Monaca Bridge is not really a competitor, as it is operated chiefly for the greater convenience of residents of Colona (beyond the terminus of the Monaca Line). A check of the competing Ambridge jitney service made on Friday, Sept. 12, 1919, showed 179 northbound and 192 southbound passengers between 6 a.m. and 7:25 p.m. No complaint has been made by the company concerning this competition, nor will it be necessary, for the improved service is driving them out of business.

In addition to the checks of bridge traffic noted, the management has had an eye upon traffic to and from the steam railroad stations. Frequent traffic checks are made to these points to determine what percentage of the travelers arrive at the depots by trolley. One check recently taken showed that at the Beaver Falls station the trolleys carried 38 per cent of the traffic and that at the Beaver station did 31.6 per cent of the handling.

Street Railway Rate Tariff*

Failure to Allow Proper Base Rates of Fare Results in Practical Confiscation of Railway Property—High Fares Mean More Money Although a Loss in Traffic — Rate of Return Should Exceed the Mere Cost of Money in Order to Allow for Contingencies in the Future

By W. H. SAWYER
President East St. Louis (Ill.) & Suburban Railway

THERE is no particular form or kind of rate schedule which should be seriously proposed for national adoption. Our standard previous to the war was a rate schedule of 5 cents, with the lowest ticket rate and the longest ride possible and still keep wheels turning. Due to this national standard most of us were facing ruin without fully appreciating the situation.

During the past three years municipal authorities have offered in most instances vigorous objection to rate schedules put forward by the railway companies, but in the final analysis their objections were based upon a human but selfish desire to secure needed service at an unfairly low price. In such instances it was necessary that the company make a fight. Few of us are by nature belligerents or looking for a fight. Many of us were criticised because we did fight openly for that which we knew to be right, but when history is written we will be given credit for having saved an essential industry.

PROPERTY HAS BEEN CONFISCATED

Actual statistics regarding the public utility industry are available to the public in complete detail—much more completely than for any other industry. These statistics prove that, on the average, street railway rates, during the war, were such that the properties were actually confiscated. Do not regard this statement as just my opinion. I state it as a fact proved by the statistics. And by "confiscated" I mean that we not only did not secure a "fair return on a fair value," but that from a legal, technical, practical, or moral standpoint our properties as a class were actually confiscated. No street railway in the whole country had rates during the war that produced a really "fair return on a fair value."

As a result, therefore, we emerged from the war broken down in credit, with our properties under-maintained and without the ability properly to serve. Practically every street railway man throughout this country is asking today that past confiscatory conditions be rectified, that there be at least a partial recognition of the splendid service which has been given under most adverse conditions; asking, in short, for a rate of fare and service conditions which will entitle him to the financial credit which is due him, not only to equalize the past inequalities, but primarily so that we may continue to carry forward in the future.

The necessity of establishing and maintaining this credit is of primary importance in any rate discussion. We all want to do that which should be done, but unless a rate carries with it real financial credit, as other business men interpret credit, our hands are tied and we are powerless to "carry on" and serve.

Cleveland's pre-war charge was 3 cents; today on an actual comparative basis, making under a service-at-cost plan the same percentage return, Cleveland is charging double 3 cents or 6 cents. There is no escaping the fact that in Cleveland at least it was necessary actually to more than double the gross revenue in order to obtain the same net income, whereas, if the costs of money were to be taken into account, Cleveland stockholders should be entitled to a net income 50 per cent in excess of the percentage obtaining pre-war.

TEN-CENT BASE RATE NOT TOO HIGH

To meet the needs of the communities served a 10-cent straight fare is not too much today for the average electric railway. Instead of being kept from so charging it would be a real blessing to the communities served if the majority of the electric railways of this country were today on a 10-cent straight fare basis. Those flat-fare cities not on a straight 10-cent basis should, in my personal opinion, be on a basis of 10-cent cash fare with reduced ticket rate. With the idea in mind that investigation regarding cities now charging 10 cents was very pertinent the information bureau of the American Electric Railway Association has within the last few weeks turned over to me answers to revised questionnaire sent out to all of the 123 10-cent cities. One important question asked in the questionnaire was: "In your opinion what was the effect upon traffic of putting into effect a 10-cent fare?" Only three companies reported a decrease in traffic of over 15 per cent due to an increase in fare to 10 cents, and two out of three of those companies jumped from 5 cents direct to 10 cents. Approximately 25 per cent of the companies reported no noticeable decrease whatever. The remainder showed a decrease of from 5 to 15 per cent, and the general average showed that the decrease in traffic due to increasing fare to 10 cents was about 8 per cent, certainly under 10 per cent.

In answer to the question, "Taking everything into consideration, are you better off with a 10-cent fare than if the old rate had remained in force?" the answer was 100 per cent "Yes." Some of them seemed to think we were asking a foolish question; they not only said "yes" but they said "certainly," "assuredly," "unquestionably," "definitely," in fact, all kinds of adjectives; there was no question in their minds. In other words, there is not a city in the country that is charging 10 cents but what needed that 10 cents and but what is getting more revenue than it would at any lower figure.

In the answer to these two questions we get indisputable evidence that a higher rate of fare does produce more revenue, thus giving a finality to all previously submitted facts; that unfair, strawman bugaboo, that a higher rate of fare will not produce more revenue, cannot be flaunted any more. Many a company has been unfairly refused a proper increase due to this excuse being put forth by the politician to prevent fair rates being granted. Commissions have refused increase in rates because, so they said, they had grave doubts as to whether increased rates would give increased revenue.

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*Abstract of paper presented before Wisconsin Electrical Association, Milwaukee, March 24, 1921.

If there are still those who maintain the evidence is either misleading or incorrect, I would ask that they await further statistics from the service-at-cost cities. When the time comes that fares are reduced in Cleveland, Cincinnati, or Youngstown, and the reduced rate of fare produces greater revenue than the higher rate of fare then we will commence to have evidence that a higher fare produces lower revenue.

Please pardon my taking so much time to prove that more money means more money, but this unfair weapon has been used against us in the past and we must not allow it to continue. Please also appreciate that I am not arguing for or against the zone system with reduced fare for reduced length of ride.

SINGLE COIN FARE AND TICKETS URGED

Assuming that some companies do not now actually need a straight 10-cent cash fare, or assuming that the day will come when the majority of the companies will not need a straight 10-cent fare, which is the preferable fare, a 10-cent cash fare with reduced rate tickets or an equivalent fare producing the same revenue in odd cents, with or without reduced ticket rates?

The return of the questionnaire by cities operated at 10 cents, either straight fare or with reduced ticket rate, brought out definitely that every executive with one exception believed from his experience that a 10-cent cash fare with reduced ticket rate was far preferable to an equivalent flat rate fare even without tickets. As a concrete example, they considered it was better for the company and the public to charge 10 cents cash, with four tickets for 30 cents, than it was to charge an equivalent straight fare, which we will assume to be 8 cents; and they, of course, considered it far preferable to charge 10 cents cash with reduced ticket rate than to charge an odd penny straight fare with less reduced ticket rate producing the same revenue. Summing up the fare situation as I glean it from the statistics and also from these questionnaires we find:

1. Zone systems are in successful operation in several places and are more satisfactory in these places to the company and to the public than a flat-fare system producing the same revenue.
2. Zone systems are objectionable to the public in most localities and the primary reason is not that the zone system proposed is inequitable or unfair *per se* but that it is believed to be discriminatory compared with existing flat-rate system under which the communities have been developed.
3. The minimum charge in any zone should not, under present conditions, be less than 5 cents.
4. Increased fare has unquestionably produced more revenue and a reduction in rates of fare will produce less revenue.
5. It is not to be expected that further substantial increases will be granted except in exceptional cases, but even with decreased operating costs the industry cannot give needed services if fares are reduced.
6. The rate of fare should not be kept unnecessarily high so as to force the car rider to pay taxes belonging to the general public. I refer to payments by street railway companies for paving and sprinkling, payments of a percentage of their revenue to the city and to all other payments which would not be a part of the cost of service—if measured by the same standards as other business.
7. In these days of registering fare boxes and of locked box fare boxes, a reduced rate ticket or token fare is, where financially practicable, preferable to the company and to the public.
8. A 10-cent cash fare, a standard coin, with reduced rate ticket or token is preferable to odd penny cash fare, with or without reduced ticket rate, producing the same revenue.

The questionnaire also showed that these executives believed that a 10-cent cash fare with reduced rate ticket was desired by their customers in preference to the lower flat rate odd penny fare.

I have given you the consensus of opinion of the committee on rates of fare of the American Electric Railway Association; I have given you the consensus of opinion of executives with whom I have been in communication throughout the country, but the fact still remains that the American Electric Railway Association as an association has no national code as to fare schedules. Its individual members have different ideas as to how the problems should be worked out in their different localities; that is but right and meet. Different conditions prevail in different cities, and even were the conditions the same, I say again the people have a right not only to the service they desire but to pay for that service in the way they desire to pay, provided they do pay the cost of service, and by cost of service I mean not only the cost of labor and materials and taxes, but the fair cost of the money necessary in the business. The money we return to our security holders will buy no more than the same amount of money accruing to them from other business and so they naturally and rightfully expect a fair return on their street railway investment the same as from any other investment. This they have not secured in the past and they must have it in the future or with credit gone we cannot function.

RATE OF RETURN MUST EXCEED THE COST OF MONEY

Just one more phase of this credit question—that is the question of fair return to street railway security owners.

The investor in the future knows that there are plenty of other opportunities to invest money in really paying investments. He knows by experience that the big portion of street railway investments have in the past not been protected and that the properties have been confiscated. He knows that the street railway investor carried during the war a load so unfair that it would have broken down and put out of business any other but this most essential business. He knows that based on today's earnings the street railway investments as a class are undesirable. He won't be caught again—he will protect himself by investing his money elsewhere unless conditions change.

You and I have no need to worry about our jobs. Any man who can successfully operate an electric railway need have no fear of a position in other fields of industry.

So, "why worry?" The investor can take care of himself; the electric railway men can take care of themselves. Why try to save an industry the credit of which has been allowed to become impaired? Why? Because it is our duty.

You may think you have talked until you were hoarse, written until your arms ached, worked until you were worn out in body and mind, but all the work up to the present has been to salvage existing investments, to protect and continue for the public existing service. Heroic sacrificing work has been done, an essential industry has been saved, but of what avail if allowed only to continue as at present, merely to exist.

New money is needed so that our electric railways may grow and expand to meet the needs of the civic communities which cannot grow and prosper except as the electric railways keep pace with their needs and requirements. Electric railway operators can carry on the good work to a successful completion so that electric railway investments may be sought for and thus make possible the improved service and the improved facilities urgently needed. Electric railway rates must be placed and kept on a basis that are comparative with rates to other business.

"A fair return on a fair value" is all the investor asks, but "a fair return on a fair value" as of today only will not bring real credit. Before a rate of fare is lowered some of the past deficiency in rate of return must be compensated for and there must be some surplus to allow for contingencies in the future. Then will investors have confidence in new electric railway securities.

The rate of fare on an electric railway should be such that:

1. The riding public may be given service which all things considered is satisfactory to them.
2. Fair wages, commensurate with wages in other industries, must be paid.
3. The return to the investor is such that new investors will willingly invest new money in new securities to finance additional facilities and equipment.

The Madison Design of One-Man Car*

BY DUDLEY MONTGOMERY

Vice-President Madison (Wis.) Railways

THE Madison Railways have operated standard Birney safety cars for about two years and have now developed a design of one-man car which is being used in an endeavor to prevent crowding at the front end, which has resulted in considerable delay in operation. Our experience indicates that a 26-in. aisle is the minimum that should be used if free movement of passengers in a car is to be obtained. With any narrower aisle, passengers will not attempt to pass except under necessity.

The new design of car as used in Madison is 4 in. wider and 2 ft. longer than the standard Birney car and has a double-door opening 15 in. wide divided into two passageways by a stanchion. The comparative weight of the car is 17,200 lb., as against 15,800 lb. for the standard car. Three criticisms of the new design which were advanced before construction were its additional weight, cost of heating and loss of fares due to the double-door opening. Tests show that the power consumption per 100 lb. per 100 miles varies from 0.3 kw.-hr. to 0.55 kw.-hr. If the car runs 165 miles a day and has a difference in weight of 1,400 lb., the saving for the lighter car is only about 7 kw.-hr. per day. The heat required in the new car is about 160 kw.-hr. per day of eighteen hours in severe weather. The loss of fares is negligible as the operator is not over 3 ft. from passengers entering at the exit door, and at points of heavy loading stands up to make the fare collection.

So far no criticism has been received to this design of car from the public, railroad commission, council, or railway company's employees. We do not feel that the present double-door arrangement will stop congestion at the front end of the present standard car. The widening of the 22-in. aisle is just as important. I am willing to go as far as possible to accomplish standard construction of cars, but I feel that we must have a car that can be sold to our patrons.

London Companies Organize

Outline of the Comprehensive Scheme of Organization of the London Underground and Allied Companies, with Duties of the Different Departments, Made Effective This Year

A SCHEMATIC diagram of the organization of the Underground Electric Railways of London and allied companies, effective Feb. 1, 1921, is given in the chart on page 680. The organization embraces ten companies as follows: (1) Underground Electric Railways of London, (2) Metropolitan District Railway, (3) London Electric Railway, (4) City & South London Railway, (5) Central London Railway, (6) London General Omnibus Company, (7) London & Suburban Traction Company, (8) Metropolitan Electric Tramways, (9) London United Tramways, (10) South Metropolitan Electric Tramways & Lighting Company. In the outline which follows No. 1 is referred to as the "underground company," 2, 3, 4 and 5 as the "railways," 2, 3, 4, 5 and 6 as the "common fund group," 7 as the "traction company" and 8, 9 and 10 as the "tramways." When no limitation is indicated reference is made to all companies.

There is a single chairman and managing director for the underground company, each of the companies in the common fund group and the traction company. This is the Right Hon. Lord Ashfield. There are separate and distinct chairmen for each of the companies in the tramways group. The assistant managing directors for departments A and B are, in charge of department A, Frank Pick, and in charge of department B, H. E. Blain. A general outline of the duties of the different departments shown in the chart is given below:

Department A.—In charge of an assistant managing director (Frank Pick). This department is charged with responsibility for:

(a) The accounting, audit and statistical work (common fund companies).
(b) The determination of fares, rates and charges.
(c) The development and establishment of routes and services and the co-ordination of traffic facilities.
(d) The publicity and advertising.
(e) The purchase and supply of stores and materials and the sale of obsolete stores, spare parts and scrap.
(f) The legal and parliamentary work.
(g) Negotiations, arrangements and agreements (subject to any directions of the chairman).

Department B.—In charge of an assistant managing director (H. E. Blain). This department is charged with responsibility for:

(a) The inspection, adjustment, cleaning and oiling of the rolling stock, lifts and escalators of the railways, with the supervision and control of the depots, yards and sidings.

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*Paper presented before Wisconsin Electrical Association, Milwaukee, March 24, 1921.

(b) The operation of the railways and control of stations.
(c) The supervision and control of the motor omnibuses, with the garages and sheds.
(d) The operation of the system of motor routes and stands.
(e) The preparation and institution of all service and duty schedules.
(f) The work of the chief passenger agent, including the supply and issue of tickets.
(g) The settlement of claims arising out of accidents, all companies (and other claims as may be directed by the chairman).
(h) The review of wages, hours, conditions of service and similar questions affecting the staffs as a whole to secure uniformity and the supervision of welfare work.
(i) Communications with the public arising out of the operation of the companies.
(j) The "safety first" work (all companies).

Department C (Railways).—In charge of the director of construction (railways) (Z. E. Knapp). This department is charged with responsibility for:
(a) The generation and distribution of power, including the control and supervision of the power-house, substations and all equipment used in connection therewith.
(b) The supervision and control of all new works, new construction and new equipment (including constructional works for the omnibus company in consultation with the chief engineer, L. G. O. C.).
(c) The conduct of engineering research and investigation on behalf of the railways.

Department D (Omnibuses).—In charge of a chief engineer (L. G. O. C.) (G. E. Shave). This department is charged with responsibility for:
(a) The renewal of omnibuses and the construction of new and additional omnibuses.
(b) The overhaul and maintenance of omnibuses in the new central depot and in the coach factories.
(c) The licensing of omnibuses and all questions arising thereout.
(d) The central stores.
(e) Engineering research and investigation work in connection with omnibuses.
(f) Fuel research.

Department E (Railways).—In charge of a chief engineer (railways) (A. R. Cooper). This department is charged with responsibility for:
(a) The maintenance and renewal of the railways and their equipment.
(b) The maintenance and renewal of the rolling stock, lifts and escalators used upon the railways.
(c) The maintenance and renewal of all buildings, whether for railways, tramways or motor omnibuses.

The chief engineer is also responsible to the director of construction (railways) for any new works in connection with existing railways.

Department F (Tramways).—In charge of a general manager (tramways) (C. J. Spencer). This department is charged with responsibility for all questions arising out of the maintenance and operation of the tramways as defined above under Departments A, B and C, except:
(a) The determination of fares, rates and charges.
(b) The co-ordination of traffic facilities.
(c) The publicity and advertising.
(d) The purchase and supply of stores and materials.
(e) The parliamentary work.
(f) The settlement of claims arising out of accidents.
(g) The maintenance and renewal of buildings, which shall be dealt with in Department A for (a) to (e) inclusive, in Department B for (f), and in Department E for (g), in consultation and agreement with the general manager (tramways).

Department G (Common Fund Group).—In charge of a secretary and treasurer (J. C. Mitchell). This department is charged with responsibility for:
(a) The customary secretarial work of the companies.
(b) The financial work.
(c) The administration of the estates and surplus property of the companies.
(d) The insurance work of all descriptions.
(e) The management on behalf of the companies of the superannuation, pension and other funds instituted by the companies.

Department H (Tramways Group).—In charge of a secretary and treasurer (E. Boys). This department is charged with responsibility for:
(a) The customary secretarial work of the companies.
(b) The financial work.
(c) The administration of the estates and surplus property of the companies.
(d) The insurance work, except national health and unemployment insurance dealt with by the general manager (tramways).
(e) The management on behalf of the companies of the superannuation, pension and other funds instituted by the companies.

Note.—In order to insure co-ordination of methods, this department shall, as far as practicable, be governed by the procedure and requirements laid down for the common fund group.

The purchasing agent in New York for the properties mentioned remains the National Railway Appliance Company, New York.

A pamphlet has been issued giving the duties of the various departments in detail.

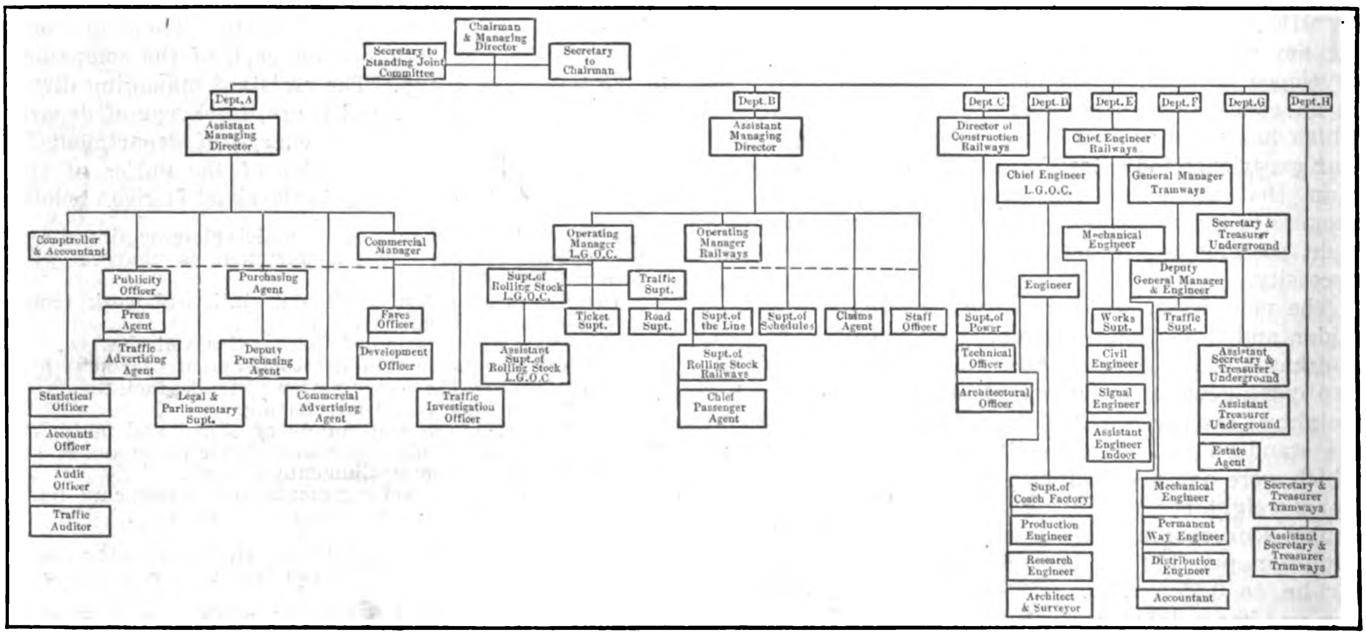
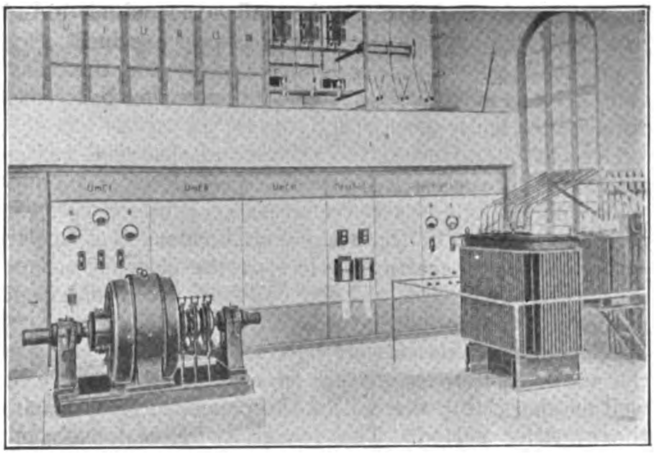

Chairman & Managing Director
Secretary to Standing Joint Committee
Secretary to Chairman
Dept. A
Assistant Managing Director
Comptroller & Accountant
Publicity Officer
Press Agent
Traffic Advertising Agent
Purchasing Agent
Deputy Purchasing Agent
Commercial Manager
Fares Officer
Development Officer
Statistical Officer
Accounts Officer
Audit Officer
Traffic Auditor
Legal & Parliamentary Supt.
Commercial Advertising Agent
Traffic Investigation Officer
Dept. B
Assistant Managing Director
Operating Manager L.G.O.C.
Supt. of Rolling Stock L.G.O.C.
Assistant Supt. of Rolling Stock L.G.O.C.
Traffic Supt.
Ticket Supt.
Road Supt.
Operating Manager Railways
Supt. of the Line
Supt. of Schedules
Claims Agent
Staff Officer
Supt. of Rolling Stock Railways
Chief Passenger Agent
Dept. C
Director of Construction Railways
Supt. of Power
Technical Officer
Architectural Officer
Dept. D
Chief Engineer L.G.O.C.
Engineer
Supt. of Coach Factory
Production Engineer
Research Engineer
Architect & Surveyor
Dept. E
Chief Engineer Railways
Mechanical Engineer
Works Supt.
Civil Engineer
Signal Engineer
Assistant Engineer Indoor
Dept. F
General Manager Tramways
Deputy General Manager & Engineer
Traffic Supt.
Mechanical Engineer
Permanent Way Engineer
Distribution Engineer
Accountant
Dept. G
Secretary & Treasurer Underground
Assistant Secretary & Treasurer Underground
Assistant Treasurer Underground
Estate Agent
Dept. H
Secretary & Treasurer Tramways
Assistant Secretary & Treasurer Tramways

CHART OF ORGANIZATION OF UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON AND AFFILIATED RAILWAY, TRAMWAY AND BUS COMPANIES

RIEHEN AUTOMATIC SUBSTATION, NEAR BASEL



INTERIOR VIEW IN RIEHEN AUTOMATIC SUBSTATION

Automatic Substation in Switzerland

Manufacturers of Electrical Apparatus Have Devised Control to Secure Simplicity, Reliability in Operation and Accessibility for Repair—Devices Differ from Those in Use in This Country, One Feature Being the Provision for Starting and Stopping by Hand and by Time Clock

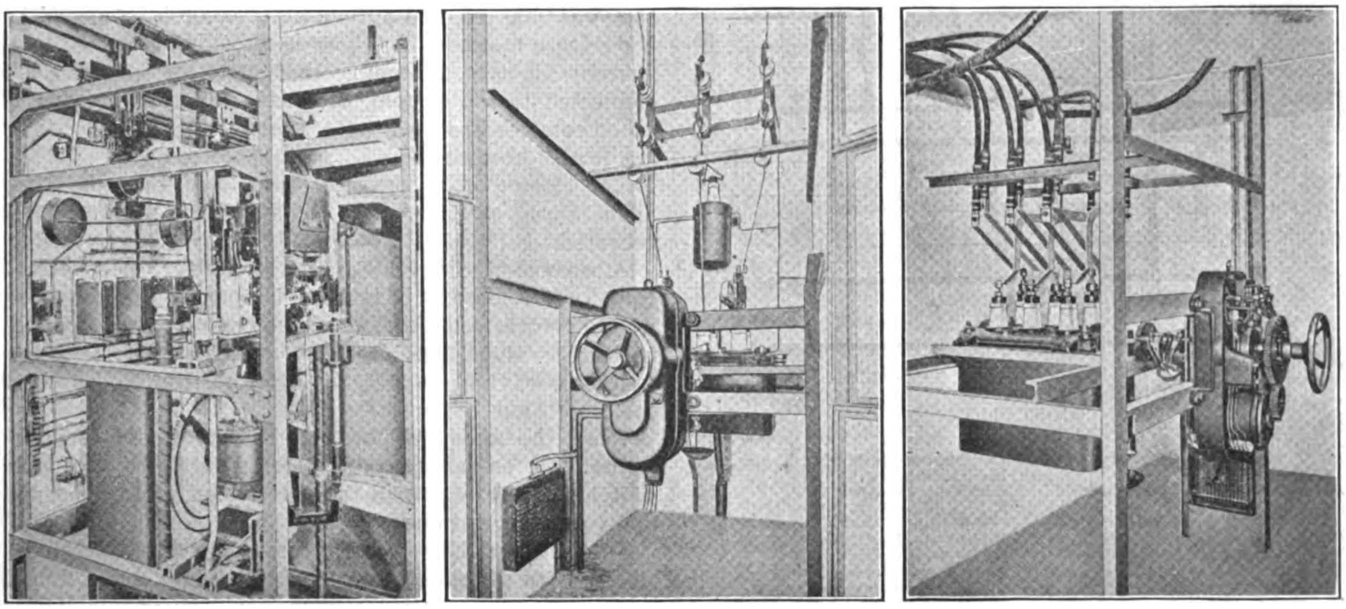
IN VIEW of the wide application in this country of automatic control of electric railway substation apparatus the readers of the ELECTRIC RAILWAY JOURNAL will be interested in developments in the same line abroad. Brown, Boveri & Company of Baden, Switzerland, have installed an equipment of this kind at Riehen near Basel, in a substation which supplies 600-volt power to the electric railway line between Basel and Lorrach, and will later feed certain projected tramway lines. The devices used differ considerably from those usual in this country and they are covered by patents. One salient difference is the provision for starting and stopping by hand and time clock, the control taking care of all operating conditions otherwise.

The Riehen substation is part of the Basel Electricity Works system, and it was built before the decision was reached to put in automatic equipment. It contains a 250-kw., six-phase, 50-cycle rotary converter equipped with a speed-limit device, transformer, regulative reactance coil, starting switch and field rheostats. Provision was made in the design for two additional rotaries of at least 250-kw. capacity each.

This substation secures its power supply from the Augst plant at 6,300 volts.

TIME SWITCH IS USED MORNING AND EVENING

The essential parts of the automatic control equipment are as follows: Time switch for cutting equipment in or out at a predetermined time; transformer and starting switches; switch-operating devices; relays of various kinds, namely, overload, time-limit, polarized, no-voltage, feeder; over-speed centrifugal switch,



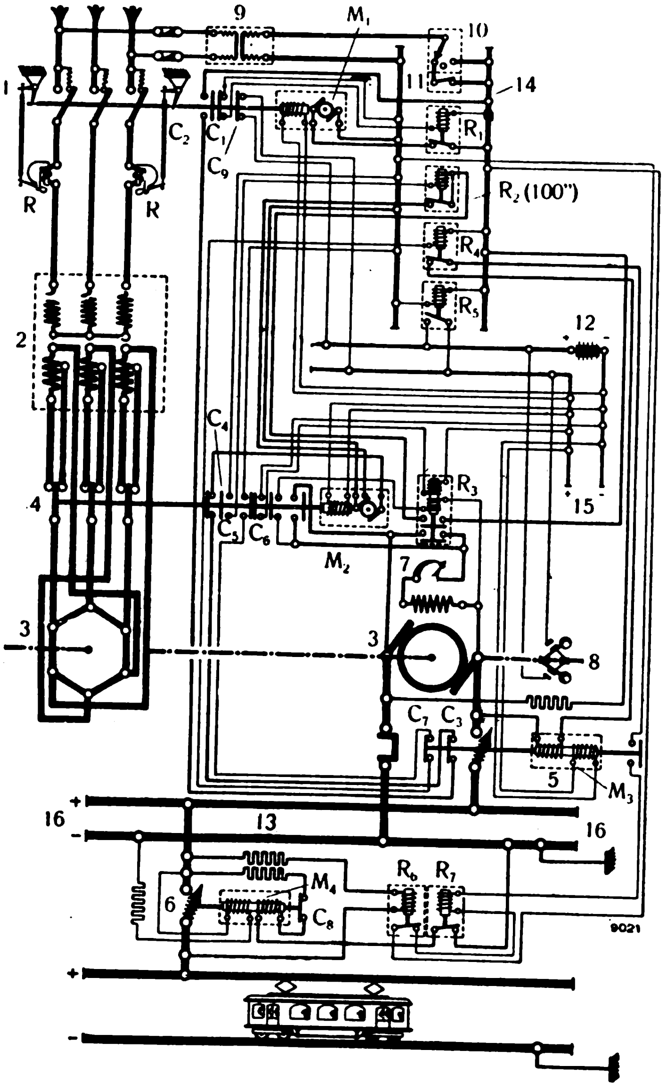
LEFT, SWITCH CELL FOR ONE ROTARY CONVERTER. CENTER, REMOTE-CONTROL MOTOR-OPERATED MECHANISM FOR TRANSFORMER SWITCH. RIGHT, REMOTE-CONTROL MOTOR-OPERATED MECHANISM FOR MAIN ROTARY SWITCH auxiliary battery and, of course, the usual circuit breakers, etc. Essentially these devices are built along standard lines. The operating devices for the heavy switches are motor-driven, solenoid operation being used where sufficiently powerful.

For the operation of the relays and electrical switchgear, special auxiliary sources are required as follows:

A small single-phase transformer connected to the primary winding of the main transformer. To this are connected the operating devices of the alternating current switchgear, the voltage coils of the time-circuit relays and the no-voltage relays.

A small portable storage battery is used for tripping the main switch supplying current to the rotary as well as energizing the coil of the polarized relay during the starting period. The feeder switches have a no-voltage release. The energy for operating the direct current contactors is obtained from the rotary itself. For the first start in the morning and for the shutting down in the evening a simple time switch is used by means of which, in starting, the "in" bus is put under pressure, and this in turn energizes the relays in a fixed sequence and causes the closing of the corresponding switches.

The release mechanism of the main switch is connected across the bus system, which after the functioning of the release system is connected to the battery voltage.



CONNECTION DIAGRAM FOR SWISS AUTOMATIC SUBSTATION

1. Transformer primary switch
2. Transformer
3. Synchronous converter
4. Starting switch
5. Machine automatic breaker
6. Feeder automatic breaker
7. Field rheostat
8. Overspeed centrifugal switch
9. Auxiliary transformer
10. Hand switch
11. Time switch
12. Auxiliary battery
13. Resistor
14. Busbar "in"
15. Busbar "out"
16. Station busbar

R = Overload relay
R_1, R_2, R_4, R_7 = Time limit relays
R_3 = Polarized relay
R_5 = No-voltage relay
R_6 = Feeder relay
C_1-C_9 = Contacts
M_1, M_2 = Motor-switch operating device
M_3, M_4 = Solenoid-switch operating device

HOW THE APPARATUS FUNCTIONS

The switching sequence for cutting in and out, and for the resumption of service after a direct current or alternating current disturbance (see circuit diagram for reference numbers) is as follows:

Time switch 11 closes (or hand switch 10 is closed), putting the "in" busbar 14 under pressure. After about three seconds, time-limit relay *R*-1 connects to this busbar the motor-operating mechanism of the main switch *M*-1.

Transformer switch 1 then closes, closing auxiliary contacts *C*-2 and opening *C*-1 and *C*-9.

With the contacts *C*-2, *C*-3 and *C*-4 closed the starting circuit of the motor-mechanism *M*-2 is closed and the starting switch is brought to the starting (right-hand) position.

In this position of the starting switch the time-limit relay R_2 is put under pressure through contacts C_8, and closes its own contacts in a maximum of about 100 seconds. In about thirty seconds the rotary has reached synchronous speed. Should the polarity be incorrect, shortly before the machine comes into synchronism, the polarized relay R_3 opens up the excitation circuit of the rotary. Time-limit relay immediately resets itself. Thus the time-limit relay R_2 closes its contacts only when the rotary polarity is correct; *i.e.*, when the polarized relay R_3 remains permanently closed during the time required by the setting of the time relay (fifty to 100 seconds). Then the contacts of relay R_2 close the "running" contacts of the motor mechanism M_2.

If the transformer circuit breaker is opened due to a heavy overload, having been tripped by means of the series overload time-limit release *R*, the breaker goes back to its no-voltage position, closing C_1 and C_9.

The closing of C_9 connects the storage battery 12 to the "out" bus 15, and automatic breaker 5 is opened by the release magnet. As there is no voltage on the direct current busbars, assuming that no other rotaries are connected to the system, the feeder breaker opens. If other rotaries are involved a reverse-current relay trips the feeder breaker.

The closing of C_1 operates time-limit relay R_1 after about three seconds, and the switching-in process is repeated.

A somewhat different arrangement for the overload time-limit release *R* is to have it operate in connection with a ratchet relay which, after opening up three times within a short period, will open the transformer switches, leaving them in the open position and locking the circuit out.

When the supply of power to the substation is interrupted, the no-voltage release relay R_5 trips all of the switches and shuts down the entire station until normal line voltage is resumed.

The effect of heavy direct current overload or short-circuit is to open automatic feeder breaker 6 and finally the machine automatic breaker 5 will come out due to overload release. The latter will then be reclosed through contacts C_7 after the operation of relay R_4 in about three seconds. The feeder automatic breaker "switches in" when the contacts of feeder relays R_6 and R_7 close, *i.e.*, when the feeder resistance comes in.

The contacts of time clock 11, which are closed during the daytime, are opened during the evening for a predetermined period. This causes no-voltage relay R_8 to operate, putting pressure on busbar 15. Switches 1, 4, 5 and 6 then come out.

SOME DETAILS OF THE EQUIPMENT

Polarized relay R_3 is a direct-current relay with two current coils having the same number of ampere-turns, electrically separate. It has two contacts which close when the armature is attracted. One coil is connected to the auxiliary battery 12 and the other to the terminals of the rotary. One contact connects the field circuit of the converter while the second connects the pressure coil of the time-limit relay R_2 to the bus 14, or disconnects it. As soon as the starting switch 4 comes in it connects the first coil to the direct-current battery circuit and the second coil to the alternating-current circuit of the rotary field. When the converter approaches synchronism and its "slip" approaches zero the frequency of the alternating current impressed upon the field diminishes and the current in the field changes to direct current when the machine is at synchronism. This may or may not be in the proper direction, but if it is not the resultant field in the relay is zero and the armature drops for about half a second, permitting it to "slip a pole," repeating the operation if necessary, which in general is not.

As previously explained, the cutting in of the feeder switch depends on the feeder resistance, *i.e.*, the resistance in the outgoing line cannot be less than a certain amount. The control of the "switching in" of the feeder resistance is obtained by shunting feeder switch 6 by feeder relay R_6. If the feeder resistance is less than a certain value, a current flows through the current coil of relay R_6 limited by a series resistance 13, which current attracts the armature of the direct-current relay. By the attraction of armature R_6 the coil of relay R_7 is disconnected and its contacts and the starting circuit of contactor M_4 are not closed. As soon as the feeder resistance permits "switching in," the contacts of relay R_6 close and relay R_7 switches in the feeder breaker after a fixed time. This arrangement prevents cutting in the feeder circuit during so-called oscillating short circuits.

Reorganizing After a Strike

Intensive Training Campaign of Trainmen Carried On in Denver Subsequent to Strike Results in Very Prompt Restoration of Service Reliability and Efficiency—Auditorium Meetings Brought to the Attention of Men by Means of Large Posters and Mimeographed Notices Which Were Given Out at the Division Offices

IRREGULARITY of service, inefficiency of trainmen and all manner of trouble are the aftermath faced by a company which undertakes a complete new organization in the transportation department after an unworthy strike. It is often a matter of a year or more before the transportation department will be functioning normally and the trainmen equipped with the proper knowledge of rules, respect for discipline and understanding of what goes to make up good service. The efforts of the Denver (Col.) Tramway to overcome the deficiency of a new transportation organization through an intensive training campaign as directed by Edward A. West, general superintendent, will therefore be of general interest.

On Aug. 1, 1920, the employees of the Denver company went on strike. The company was successful in replacing the strikers with new employees, but the majority of them were inexperienced in street railway work. Because of the dearth of instructors and the urgent need of placing cars in service as rapidly as possible, it was impossible to give these men the usual thorough instruction which is had under normal conditions. The result was the common one under such circumstances, that the company was operating cars with a force of men who were not familiar with many of the details of their work. Conductors were able to collect fares and give the motorman signals, but were unable to make out trip sheets properly and did not understand the transfer system. They were not thoroughly familiar with the city and were therefore unable to direct passengers properly or issue and collect transfers readily. Motormen were able to operate cars as long as nothing went wrong, but in doing so they were abusing the motors and equipment. They did not know how to keep the car on the line in case of trouble and were not familiar with the danger points requiring special operating precaution. Furthermore, trainmen were unable to co-operate with one another because of ignorance as to how this was done or the need for it, and many delays and unreliable service resulted.

It was evident that individual instruction of the entire force would be slow and expensive, and the management therefore decided to give the men intensive instruction in groups, thus economizing the time of the instructors to a great extent and making it possible to reach the entire force in a much shorter length of time.

The subjects to be presented to the trainmen fell into two divisions, requiring different methods of instruction. The first of these divisions included all of those subjects which could be presented to the men in purely lecture form and readily impressed on their minds without resorting to "quizzing." The second division included those subjects of a more highly technical nature which could not be made clear without more or less individual instruction accompanied by examinations and opportunity for the men to ask questions.

All of the subjects in the first division were presented at general meetings of all trainmen in the Tramway Building Auditorium, the speaker presenting his subject only twice on the one day. For the convenience of the men, these meetings were divided into two sections, one in the morning at 10:30 and the other in the evening at 7:30, thus giving practically all men an opportunity to attend.

The subjects of the second division were presented to small groups of trainmen at the several division headquarters and each class was conducted several times at each division. Schedules were so arranged that there were three times of meeting during the day: 10:30 to 11:30 a.m. for night men; 2:30 to 3:30 p.m. for split run men and a small proportion of night and day men, and 7:30 to 8:30 p.m. for day men. Special times were set for a small number of "matinee" men, unable to attend at any of the above periods. Each class, when started, continued to attend at the same time every day until the complete course was covered. Each man was required to take an examination after having completed the entire course of the division meetings.

The arrangement of meetings and subject matter covered is indicated in the following program:

AUDITORIUM MEETINGS

Date	Subject	Speaker
Sept. 16	Day, night and split boards	J. L. Adams
	Accident reports	S. G. Shaw
Oct. 6 and 11	Transfers	F. W. Werner
Oct. 25	The instruction of new men	W. L. Abernathy
	The supervisory staff	B. V. Polkinghorne
Oct. 29	Naming and numbering streets	F. W. Werner
Nov. 5	The treatment of passengers	J. L. Adams
Nov. 18	Organization and discipline	E. A. West
Dec. 2	The prevention of accidents	H. S. Robertson
Dec. 9	Relation between employer and employed	E. Stenger
Dec. 16	Fire runs	Fire Chief Healy
	The traffic ordinance	Traffic Sergeant Hunt

DIVISION MEETINGS FOR CONDUCTORS

Subject	Instructor
Trip sheets and turn-ins	G. H. Brinker
Schedule speeds and running times	H. J. Kuster
Dispatching	B. Busch
Transfers	G. H. Brinker
Drill on rule book	W. L. Abernathy
Examination.	

DIVISION MEETINGS FOR MOTORMEN

Schedule speeds and running times	H. J. Kuster
Dispatching	B. Busch
Equipment	N. R. Love
Handling controller and brake; emergency repairs	A. J. Singer
Speed over special trackwork; dangerous crossings, intersections and hills; electric switches	A. J. Singer
Drill on Rule Book	W. L. Abernathy
Examination.	

Auditorium meetings were brought to the attention of the men by means of large posters, one for each division, and also by means of mimeographed notices which were given out at the division offices. In order to secure maximum attendance, each division superintendent detailed a man to see each trainman on his division and find out which meetings he would attend. This was very helpful in boosting the attendance at the early meetings, but was found to be unnecessary after the men's interest had been aroused.

The division meetings were supplemented by printed material covering the same ground as the meeting. These were handed to the men at the close of each meeting and covered the subject matter for the next meeting. A few days before his meeting, a list was sent to each man of the meetings which he was scheduled to attend, showing the subjects of each meeting, the time, date, place and instructor. At the time of sending these notices out, a roll-call sheet was prepared in quadruplicate, showing the name and number of each man and the meeting with time, place, date and instructor for each class, thus giving a square for each meeting for each man. The original was used by the instructors, the first copy held in case of loss of the original, the second copy used as a record sheet in the office, and the third copy sent to the division superintendent.

A large card was made out for each trainman showing his name, number and division and occupation (motorman or conductor). Assignments were recorded on this card in red. When a man attended a division meeting the date and his grade for the meeting were shown in black, opposite the proper meeting number. Auditorium meetings were shown by stamping the date of the meeting at the bottom of the card with a crown dater. The back was used for road instructions given the man.

As the auditorium meetings were not repeated, the misses were not followed up. If a man missed one of the division meetings, however, he received an assignment to another meeting and a notice was sent to him to this effect. The new assignment was shown on his record card. A copy of the notice to the man was placed in a tickler file to come out on the day after the assigned meeting. In many cases where a man had missed a number of meetings, he was notified to report to the man in charge of schedules and make arrangements for attending. Every man had at least two opportunities to attend, and a large number had more than two opportunities. Notice of each miss was sent to the division superintendent interested.

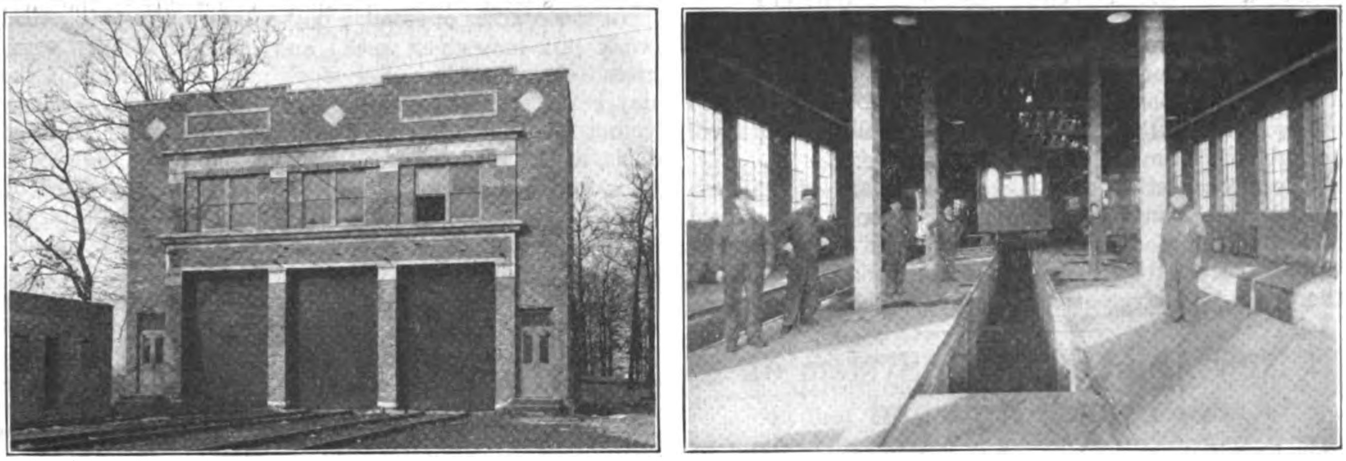
The men were paid for auditorium meetings at the rate of 50 cents per meeting. Division meetings were paid for at the regular rate of the man, for one hour. The reason for this was, when the original plans were made, the day and night split board was in effect, and it was thought that it would be necessary to relieve each man during his time on duty, paying him for the entire time as if he were working. Shortly after the classes were started these runs were discontinued and a straight nine-hour board was put into effect. The result of this was that a large percentage of the men attended the meetings before or after going on duty.

The measure of success gained by the officials in securing attendance at these meetings is given in the following table:

Total number of division meetings	293
Total attendance at division meetings	4 184
Average attendance per meeting	14.3
Total attendance by men who left company	283
Total attendance by men still with the company	3,901
Number of men who finished meetings and examination	512
Number of men who missed examination	139
Number of men who missed examination and one meeting	36
Number of men who missed examination and two meetings	73
Number of men who missed examination and three or more meetings	170
Average number of meetings attended by each man	4.2
Percentage attendance	76.5
Total number of auditorium meetings	10
Total attendance	3 540
Average attendance at each meeting	354
Total attendance by men who have left company	272
Total attendance by men still with company	3,268
Average number of meetings attended by each man	3.5
Percentage attendance	35

The final results of this instruction work are impossible of exact measurement, because other conditions than the instruction program in force at the same time helped to improve the service. The final measure of the results is of course the increase in revenue due to the increased efficiency of the men. Just prior to the time at which the instruction work was started, the total revenue from city lines was approximately $2,000 per day less than for the same period in 1919. During the early part of January, 1921, just after the completion of the instruction work, this difference had dropped to approximately $750 per day, or an increase in the general trend of revenue of approximately $1,250.

Part of this improvement is undoubtedly due to the operation of a greater number of cars, but it is also due in great measure to higher operating speeds and greater reliability of service, which are in turn at least partially attributable to the instruction work. The cost of the instruction campaign was not in excess of $5,500. At a conservative estimate that it resulted in an increase in revenue of only $200 per day, the cost was paid for in the course of less than one month's operation.



AT LEFT, FRONT OF NEW CARHOUSE IN MASSILLON, OHIO. AT RIGHT, CONCRETE FLOOR AND OPEN TYPE PITS FACILITATE INSPECTION WORK

New Car House in Massillon Occupied

Northern Ohio Traction & Light Company Moves Into New Brick Carhouse in Massillon, Replacing the Main Street House, Which Was Destroyed by Fire

THE old carhouse of the Northern Ohio Traction & Light Company on Main Street in Massillon was abandoned a short time ago when the occupancy of the new house, built just off the Canton-Massillon Road, was completed. The new carhouse, a brick building with stone trimmings, will care for twenty-two city cars, a snowplow and a work train. It contains a repair shop, with a supply building adjoining, where facilities are provided for making only the lighter car repairs. The main building is 63 ft. wide by 120 ft. long and two stories high.

On the first story open or intercommunicating type pits extending practically the full length of the building facilitate inspection, repairing and cleaning of cars. The tracks over these pits are supported on steel columns incased in concrete. The upper floor, supported by center columns of the same type, contains the dispatcher's office, a trainmen's club-room, separate lockers for the mechanics and trainmen and complete shower baths. The clubroom, containing comfortable chairs, pool tables, books and magazines, is an exceptionally attractive place.

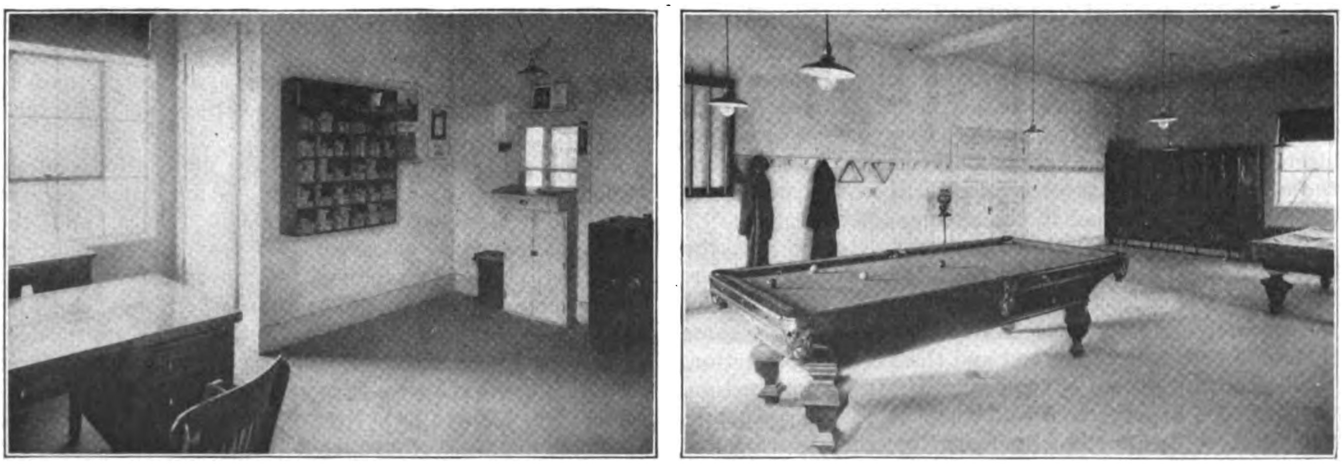
The floors of the building are concrete. It is heated with a vapor heating system.

The carhouse which was damaged by fire some years ago will soon be completely wrecked. The property faces a frontage of 60 ft., with a depth of 420 ft. The new location was selected in order to release for sale this more valuable city property.

There are about 200 ft. of switches in and around the carhouse. As the demands for more trackage increase additions will be made to the yard in the rear of the building. One of the company's substations, itself an attractive building, is located on the same property only a short distance from the carhouse.

Work of F. A. E. S. Is Progressing

A RECENT statement by the executive secretary of the Federated American Engineering Societies, L. W. Wallace, says that permanent headquarters have been established at 719 Fifteenth Street, N. W., Washington, D. C., where there will be a conference room for those engineers who may desire to use the headquarters as a meeting place. Mr. Wallace will be permanently located at this office in the near future. The statement also mentioned recent activity in a number of states regarding the licensing of engineers. While the F. A. E. S. has not initiated any such legislation nor urged its passage, it has taken the position that it desires to be instrumental in securing the passage of bills that will



AT LEFT, A CORNER OF THE DISPATCHER'S OFFICE ON THE SECOND FLOOR. AT RIGHT, TRAINMEN'S CLUBROOM ON THE SECOND FLOOR, MASSILLON CARHOUSE not be detrimental to public interests and to the engineering profession. The field work of the committee on elimination of waste in industry, to which reference has already been made in this paper, will be completed by April 15, and it is expected that the final report will be published some time in June.

The next meeting of the executive board of the Federated American Engineering Societies is to be held in Philadelphia on April 16. The dinner in the evening will be addressed by President Hoover, and it is expected there will be a large attendance of engineers.

New Apprenticeship System of French Railroad

The Paris-Orleans System, Which Will Soon Have an Extensive Electrified Mileage, Has in Use a Comprehensive Plan for Training Mechanics

IN RECENT issues of the *Revue Générale des Chemins de Fer* and the *Génie Civil* some interesting detail is given of the apprenticeship system which is in use by the Paris-Orleans Railway. While this is a steam road, the principles which it has developed have wide application.

The courses of instruction are designed to give apprentices both practical and theoretical training. The students are admitted between the ages of fourteen and seventeen years on the basis of a simple examination, including medical inspection. On admission, apprentices sign a contract which is countersigned by the parents, under which they agree to remain until their military service begins. The breaking of the contract involves forfeiture of the right to a cash reward on completion of the course.

Each year about 400 students are admitted, and they remain to the end to a very satisfactory extent.

The fundamental principles followed in the course are these: (1) The apprentice is developed in the shop, where his work is followed as in a school. (2) He is paid enough to hold him, and he is given sufficient practical work partially to offset his wages and at the same time to interest him. (3) His theoretical instruction, for which about six hours per week are reserved, consists principally of showing why and how the work must be done in a particular way. It comprises courses in French, arithmetic, geometry, physics, mechanics, drawing and technology.

APPRENTICES ARE PLACED IN SPECIAL SHOPS

The apprentice is not placed alone in the midst of regular workmen, but is given special equipment in a separate but real shop. He learns his trade through productive work; making, in the Orleans shop, complete locomotive repairs, for example. Experience shows that the apprentices can become as skillful in this way as if they had been retained in the regular shops.

Unless it is absolutely impossible to do so, the apprentices are grouped in the shop under the surveillance of an instructor, who can effectively direct ten to twelve young men. As far as possible the same instructor gives the practical and theoretical instruction.

The railway gives two general varieties of instruction, that at the depot shops and that at the main shops. The first is designed principally to produce workmen capable of becoming traveling locomotive inspectors and locomotive repair foremen, while the other is to train specialists in the various branches of shop work.

In the courses one-half a day is devoted to theoretical work (six hours per week) and instructive shop exercises (eighteen hours per week), the remainder of the day being spent in routine work. In the first year the young men are occupied at the bench-vise, on machine tools, at the forge and in the boiler shop. In the second year they are grouped in special sections supervised by selected workmen, to whom they serve as assistants. In the third year they work under the direction of instructors but without special workmen.

The foundry and forge apprentices pass a year in one or the other of two special schools, where they follow a practical course and cover fundamentals of descriptive geometry, tracing of drawings, manual work of the foundry on one hand, or one on theoretical rules of the art of modern forging, rules of welding and actual forge work for the other.

The theoretical instruction in the general course covers three years, although the program is for two years only, the second year being taken up with review of the first-year courses.

A supervisor has oversight of the apprentices throughout courses, and competition is fostered by the giving of prizes for excellence in passing examinations. Graduates from the courses receive diplomas and leather-bound records of the results of their examinations.

The young men are paid at the start from 1¼ to 1¾ francs per day, according to age, and the compensation is increased gradually until they reach as much as or even more than the regular workmen are paid, as their skill and capacity increase.

THE "SECOND DEGREE" COURSE

Young men who in their first year are deemed to be capable of profiting by a higher type of instruction than that given the apprentices are admitted to a three-year complementary course. About one-thirtieth of the new men, or 7 to 8 per cent of the total number of apprentices are admitted to this course each year. This course is covered by a special contract. It covers more advanced principles of mathematics, the elements of mechanics and physics sufficient for the understanding of the operation of the machines and the purposes underlying shop operation, a course in steam machinery and in the repair of the complete equipment, and is topped off by a course in industrial design, some fundamentals of electricity, chemistry and political economy. These courses are conducted by correspondence with experts at the company headquarters at Orleans. An examination is held each month.

The "second degree" apprentices are counted upon to assure a supply of recruits for positions as inspectors, foremen, underdepot chiefs, etc.

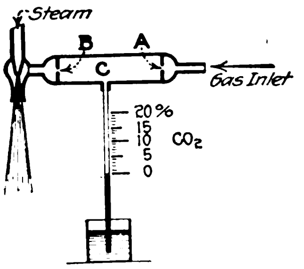
As to the financial results of the apprentice system, these are difficult to demonstrate. Apprentices receive annually a total of about 3,500,000 francs, and the general expense is about 100,000 francs. In addition, machines which are repaired by apprentices are out of commission somewhat longer than when they are prepared in the regular way. The first year the apprentices undoubtedly cost more than they return, but the reverse is true during the second and third years. On the whole the 1,200 apprentices appear approximately to produce enough to compensate for the cost of operating the plan. In addition there is the improvement in recruiting facilities and in the development of better characteristics in the personnel.

Improved CO_2 Recording Equipment

Added and Improved Features Make CO_2 Recorder More Valuable for Preventing Inefficient Boiler Operation—Remarkably Quick Action, Greater Accessibility and Simplicity of Parts Among Advantages

THE Uehling Instrument Company has introduced a new model CO_2 recording equipment, known as style "U," which embodies important improvements over the superseded model. Chief among its advantages are remarkably quick action, greater accessibility and simplicity of parts and the economy of combining in one machine means for determining CO_2 simultaneously from any number of boilers up to six.

A single-unit Uehling CO_2 equipment for one boiler consists of three principal parts, namely, a CO_2 meter proper, a recorder and an auxiliary boiler front indicator. The function of the meter, which is placed wherever most convenient, is to actuate the boiler front indicator and the recorder in the engineer's office.



THE CHAMBER OF THE CO_2 METER, ILLUSTRATING THE PRINCIPLE INVOLVED IN ITS OPERATION

The flue gas is analyzed—that is, the CO_2 is extracted—in the meter. The principle involved in the operation of this machine depends upon the change in pressure caused by a change in volume in a stream of gas flowing through two apertures. Referring to the diagram, gas is drawn continuously by the action of an aspirator through aperture *A* into the chamber *C* and out through aperture *B*. A reduction of the gas volume between the two apertures caused by the absorption of the CO_2 content causes a change of pressure or tension in chamber *C*, which is transmitted to the recorder and indicator calibrated in per cent CO_2.

The CO_2 meter consists essentially of a cylindrical regulator on which is mounted the analyzing mechanism. This regulator maintains constant the suction created by the aspirator, thereby eliminating all changes in pressure between the two apertures except those caused by absorption within the chamber. It is the latter changes in pressure which the indicator and recorder register.

Suction in the chamber actuates the recorder and indicator continuously and almost instantaneously. The only appreciable lag was formerly in the travel of the gas from the boiler to the instrument. In the new model the gas travel is hastened by utilizing the main aspirator's exhaust in an auxiliary aspirator to draw the gas from the boiler up to the absorption chamber, while the main aspirator simply draws the gas sample through the absorption chamber. The preliminary filter, which removes soot and dirt from the sample before it reaches the intermediate and final filters on the machine, has been redesigned so that the filter chamber can be conveniently cleaned without interrupting the operation of the apparatus. This method of flue gas analysis employs no chemicals, but substitutes for them a convenient dry absorbent carton, readily removed and replaced.

Multiple equipments combine in a single outfit means for measuring the percentage of CO_2 from one up to six boilers independently. This apparatus is designed on the unit plan and may be added to from time to time. For instance, a plant having initially an equipment of less than six units can easily have attached additional units, until the total is six, as new boilers are installed.

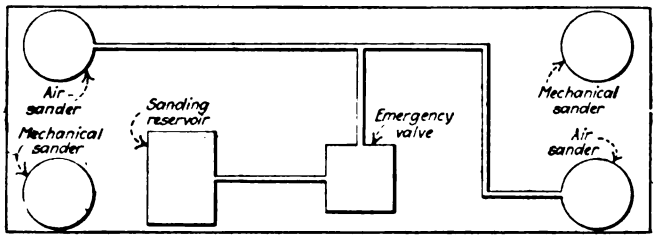
Mechanical Sanders for Safety Cars

Two Air Sanders Used on Safety Cars of Trenton & Mercer County Traction Company Being Replaced with Mechanical Sanders in Interest of Safety and Economy

BY HERBERT E. KROUSE
Master Mechanic Trenton & Mercer County Traction Company, Trenton, N. J.

ON THE sixty Birney safety cars which the Trenton & Mercer County Traction Company is operating the sanding equipment originally consisted of four sand hoppers with air sanders, all of which were in operation whenever an emergency application of the brakes took place. This caused an exceptionally large amount of sand to be used, which the company's officials felt could be somewhat reduced. Results of trials made in Trenton have shown that, while the air sanding feature which is incorporated in the M-28 brake valve has many good points, still a mechanical sander which will operate with a slight continuous foot pressure seems preferable.

The excessive amount of sand used with air-operated sanders, the labor necessary for drying the sand and filling the sand boxes, the added duty put on the air compressor, the lack of sand where the air fails and the rather high maintenance of the brake valve which is used to operate the air sander combined to make it desirable to change this part of the equipment. The accompanying diagram shows the arrangement which is now being used. One air sander on each end of the car has been removed and foot-operated mechanical sanders, manufactured by the Nichols-Lintern Company, have been substituted. In regular service this would give but one sand box delivering sand to the rail instead of two.



ARRANGEMENT OF SANDING EQUIPMENT FOR SAFETY CARS

The two remaining air sanders are disconnected from the brake valve, but still retain their connection with the emergency valve. This assures the delivery of sand to the rail during an emergency application from either the brake valve or the controller handle, and insures that but two sanders are working instead of four. The hinged air lever is no longer a necessity and this change should materially increase the life of the lever and reduce the maintenance cost.

From results so far obtained, we believe that by carrying out this change we shall be able to effect a very large saving over our present cost for maintaining the sanding equipment on our safety cars and in all other items bearing a relation to this one there will be a corresponding saving.

Boiler Inspectors Meet in Detroit

THE first annual meeting of the National Board of Boiler and Pressure Vessel Inspectors brought together at the Hotel Statler in Detroit recently a group of about sixty men, including members of the board itself, members of the boiler code committee of the American Society of Mechanical Engineers and other interested persons.

The first day was devoted to addresses. Dr. D. S. Jacobus, acting chairman of the boiler code committee, told of the development of the code, emphasizing the fact that no action had been taken without consideration of the interests of all involved in the questions under discussion. Charles E. Gordon, chairman of the American Uniform Boiler Law Society, told how the first boiler code committee came to be appointed by Colonel E. B. Meier, then president of the A. S. M. E.; how the society had reached the limit of its functions in the formulation and interpretation of the code; how the Uniform Boiler Law Society had been organized to promulgate the code, and how the National Board of Boiler and Pressure Vessel Inspectors had been organized at the instigation of the American Uniform Boiler Law Society.

Some of the other speakers were E. R. Fish, vice-president Heine Safety Boiler Company; F. R. Low, editor of *Power*, and J. G. McCabe, commissioner of the city of Detroit and chief inspector of boilers for the State of Michigan.

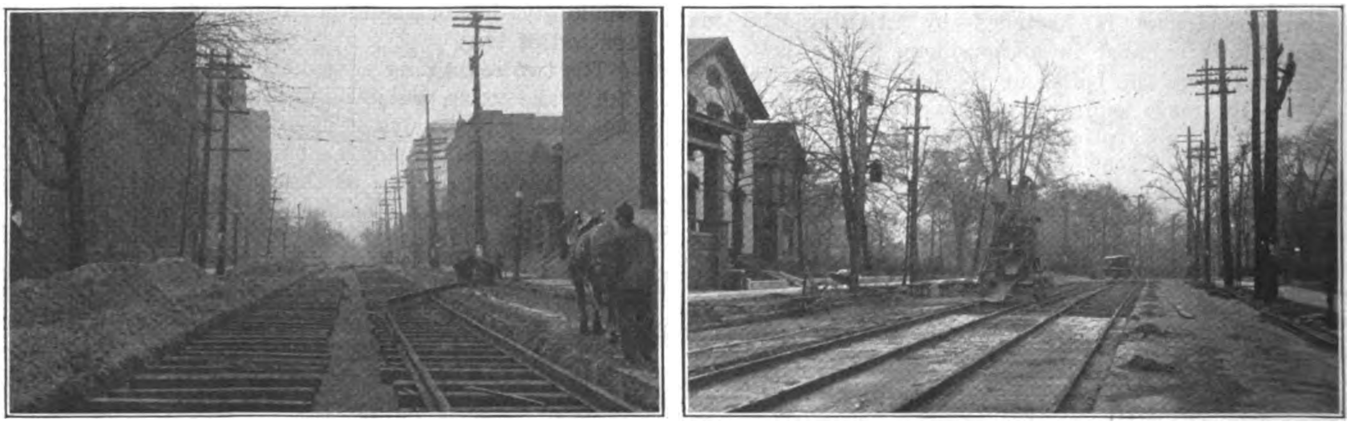
On the second day the members of the board took part in the deliberations of the boiler code committee, the meeting of which was held at Detroit in order to give the committee the advantage of conference with men from all over the country who are enforcing the code. Joseph F. Scott, inspector from New Jersey, is to continue as chairman of the National Board, and C. O. Myers of Ohio as secretary-treasurer. The objects of the Board of Boiler and Pressure Vessel Inspectors as stated in the constitution adopted are as follows: To promote uniform boiler laws; to secure uniform approval of specific designs of boilers and other pressure vessels, as well as appurtenances and devices used in connection with their safe operation; to promote one uniform code of rules, one standard stamp to be placed upon all boilers constructed in accordance with the requirements of that code, and one standard of qualification and examination for inspectors who are to enforce the requirements of said code, and to compile official statistics.

FOUNDATION READY FOR THE LAYING OF THE TRACKS

Track Construction During Severe Weather

ACCOMPANYING photographs show different stages of the work of double tracking a line in Fort Wayne, Ind., by the Indiana Service Corporation. This work was done on Clinton Street, between Main and Lewis Streets, a distance of five blocks. The work was completed in a little less than a month's time at a cost of approximately $50,000. During the construction the temperature of the weather was below freezing for a considerable part of the time and in one of the accompanying illustrations the substructure may be seen covered with manure to keep the new construction from freezing.

Previous to the double tracking of this line there was a single track on this street, but the congestion of traffic on Calhoun Street, which is one block west of Clinton Street, and is the main traffic street of the city, was so great that some change was imperative. It was accordingly decided to double track the line through Clinton Street and run the cars both ways on this street instead of into the city as was done previously. The city authorities insisted that the Indiana Service Corporation complete the work within one month, and the work was done in this time by working both day and night shifts.



AT LEFT, TIES IN PLACE AND TRACK CONSTRUCTION STARTED. SUB-BASE COVERED WITH MANURE TO PREVENT FREEZING. AT RIGHT, TRACKS IN PLACE AND CONCRETE BEING POURED

Letters to the Editors

Accident Reduction Versus Excessive Concentration Upon Fare Collection

NEW YORK CITY, March 25, 1921.

To the Editors:

A recent analysis of damage and injury claims and suits against street railways showed that the primary cause of one class of accidents is that more attention is devoted by the conductor to the collection of fares than to the safety, comfort and convenience of his passengers.

It is all very well to endeavor to impress the car operatives with the importance of "safety first," but the relation of fare collection to this must not be overlooked. While the now almost universally used "closed step and door," especially of the type used in the one-man car, have, if properly used, a great tendency to lessen "step accidents," they introduce danger of accident if carelessly operated. This is due to the fact that there have been laid on the car operatives, especially on the conductors or fare-takers, other duties which engage their attention to the exclusion of care which should be exercised for the safety, comfort and convenience of the passengers.

The "prompt and accurate" collection of fares is made a fetich by many street railway companies, although modern fare-collection practice renders it no longer necessary for the conductor to concentrate his whole attention on that one point.

On one property investigated, not 10 per cent of the conductors paid more than perfunctory attention to the opening and closing of the steps and door. A complete analysis of the situation on this road and on others plainly proved that the trifling saving in fares effected by the strict attention required of the conductor in completely collecting them was but a small fraction of the resulting cost of the accidents, the unfortunate effect of the "near accidents" and the accompanying irritating incidents. While "safety first" was well propagated among the carmen, there was lacking the incentive that existed with reference to the collection of fares. The fare-taker was held personally accountable for proved failure to collect the full amount and number of fares and consequently manifested a strong interest in this portion of his duties.

This matter was brought strongly to the attention of the writer many years ago when he was operating a street railway on which there was not only the usual rush traffic at morning, noon and night, but which had, during the summer season, tremendous rush traffic during whole days due to excursionists and other pleasure seekers. This was complicated, at that time, by the use of open cars and by the fact that the conductor personally collected fares by passing through the car or on the side-board of the open cars. After analysis of the situation the stress on the carmen regarding fare collection was reduced and more emphasis was laid upon accident prevention, with a full explanation to the carmen as to the reasons therefor. The results were carefully watched and, as far as possible, tabulated. The first results were not especially encouraging as regards fare collection, but the results as to the lessening of accidents were so good that the proof of the efficiency of the change was noticeable. After the elimination of the carmen who dishonestly took advantage of the concession, the number of accidents was permanently reduced more than two-thirds.

This matter is certainly worth the consideration of many street railway managers, as it is found that few of them have properly considered this aspect of the case. "MANAGER."

"Present Value" in the Galveston Case

CHICAGO, April 1, 1921.

To the Editors:

In your issue of March 19, page 571, there is a summary of a court decision entitled "Present Value Theory Rejected." The title is misleading, for the court sustained the present value theory, and actually added 33⅓ per cent to the original cost to get the prospective reproduction cost, from which accrued depreciation was deducted. H. P. GILLETTE.

[EDITOR'S NOTE.—The thought back of the caption written was that the special master's proposed plan of recognizing present value in the Galveston case was rejected. Mr. Gillette is correct, however, in his statement that the court did not reject, but rather followed, the present value theory as the correct basis, as described in the article, although the court took a somewhat novel method of arriving at the figure to use.]

Car Development in Boston

IN THE March, 1921, issue of *Stone & Webster Journal* appears an interesting account of the development of the urban transportation system in and around Boston, Mass., from the time that coaches and omnibuses were first operated. It seems that the first omnibus in Boston, the "Governor Brooks," started running in 1833, over a route from the Winnisimmet Ferry at the foot of Hanover Street to Roxbury. The fare was 12½ cents and it took an hour and a quarter to make the trip. The bus was drawn by four horses and had seats for eighteen passengers outside and six inside, making a total of twenty-four.

The first horse railway in Massachusetts is said to have been from Harvard College, Cambridge, to Union Square, Somerville, about 1½ miles. The equipment was a dilapidated steam railroad coach, to which a pair of horses was hitched. There is a wide disagreement as to the date of the brief career of this horse railway. In 1852 the first charter was granted to a horse railroad. This was to what was known at that time as the Dorchester & Roxbury Railroad. The first horse-drawn street car was run over Boston streets on March 26, 1856. Electric cars were first operated on Feb. 16, 1889.

The original horse cars were 16 ft. long, with a seating capacity of twenty. The first cars with electric equipment seated thirty-four passengers and cost $3,500. In 1905 the semi-convertible car was introduced. This was 48 ft. 2.5 in. over all and had seats for fifty-two passengers and cost from $10,000 to $12,000. In 1917 the center-entrance, 6,000 type car was first put on the streets. This car is 48 ft. 2.5 in. over all, seats fifty-eight and cost $15,000. The Cambridge subway cars are 69 ft. 2.5 in. over all, seat seventy-two and cost $24,000 each.

Association News

Audit Nearing Completion

PRESIDENT GADSDEN was in New York last week. In speaking of the association affairs, he said that the financial audit, which is being made under the direction of M. R. Boylan, Public Service Railway, is nearing completion. The check-up indicates that the loss due to misappropriation of funds will exceed the amount originally given out. At the present time this is estimated at from $60,000 to $70,000.

No definite action has been taken on the selection of a permanent secretary. One suggestion, made by several members of the association representing large interests, is that the position of secretary be not filled immediately. Several names for the position of secretary have been mentioned.

The next meeting of the executive committee will be held on April 15.

Convention Committees

TWO additional committees, one on convention location and one on exhibits, have recently been appointed to assist in perfecting plans for the 1921 convention.

The personnel of the committee on location consists of J. G. Barry, General Electric Company, New York, chairman; D. B. Dean, Kuhlman Car Company, Cleveland, Ohio; F. C. J. Dell, National Railway Appliance Company, New York; H. B. Flowers, United Railways & Electric Company, Baltimore, Md.; F. H. Gale, General Electric Company, Schenectady, N. Y.; B. A. Hegeman, Jr., National Railway Appliance Company, New York; C. L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; J. B. Kilburn, Hale & Kilburn, New York; W. H. Sawyer, East St. Louis & Suburban Railway, East St. Louis, Ill.; J. N. Shannahan, Newport News & Hampton Railway Gas & Electric Company, Hampton, Va.; H. D. Shute, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and J. J. Stanley, Cleveland Railway, Cleveland, Ohio.

The committee on exhibits is made up as follows: J. C. McQuiston, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman; F. C. J. Dell, National Railway Appliance Co., New York; F. H. Gale, General Electric Company, Schenectady, N. Y.; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio; E. B. Meissner, St. Louis Car Company; W. J. Pine, Railway Utility Company, Chicago, Ill.; E. C. Price, Indianapolis Switch & Frog Company, Cleveland, Ohio; A. M. Robinson, J. G. Brill Company, Philadelphia, Pa.; W. L. Schaeffer, National Tube Company, Pittsburgh, Pa., and L. W. Shugg, General Electric Company, Schenectady, N. Y.

The exhibit committee has sent to manufacturer members through acting Secretary Welsh four questions concerning the holding of an exhibit at the 1921 convention. It is hoped to determine in advance if possible the attitude of the manufacturers on this matter due to present depressed business conditions and the unsatisfactory proposition offered by the pier representatives at Atlantic City. The questions are based on a charge for exhibit space of 60 cents per square foot, the same as last year. Each member is requested to say if he favors holding an exhibit at Atlantic City, whether or not he will exhibit, and approximately how much space he will use. Answers are requested by April 12 due to the fact that the matter must be definitely decided at the coming executive committee meeting, to be held on April 15.

Delegates to Annual Meeting of Chamber of Commerce

ACTING SECRETARY J. W. WELSH of the American Association has just announced the names of the national councillor and alternate and the delegates and alternates for the annual convention of the Chamber of Commerce of the United States, to be held in Washington, D. C., April 27 to 29. The list follows:

National councillor, Lucius S. Storrs, president the Connecticut Company, New Haven, Conn.; alternate, J. H. Hanna, vice-president Capital Traction Company, Washington, D. C. Delegates, J. P. Barnes, president Louisville (Ky.) Railway; W. A. Draper, vice-president Cincinnati (Ohio) Traction Company; P. H. Gadsden, vice-president United Gas Improvement Company, Philadelphia, Pa.; John H. Pardee, president J. G. White Management Corporation, New York, N. Y.; W. H. Sawyer, vice-president E. W. Clark & Company Management Corporation, Columbus, Ohio; Thomas S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va. Alternate delegates, H. W. Blake, editor ELECTRIC RAILWAY JOURNAL, New York, N. Y.; F. R. Coates, president Toledo Railways & Light Company, Toledo, Ohio; D. B. Dean, manager Kuhlman plant the J. G. Brill Company, Cleveland, Ohio; M. B. Lambert, manager railway department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; Charles C. Peirce, manager railway department, General Electric Company, Boston, Mass.

Way Committee Meets

A MEETING of the Engineering Association committee on way matters was held at association headquarters on April 6. All day and evening was spent in technical discussion of standardization of special trackwork, joint welding and allied topics. The results of a large amount of detail work by sub-committees were presented and it was evident that real progress has been made in the difficult work of standardizing frogs, crossovers, turnouts, etc. Some recommendations as to standards were adopted and a tentative program was laid out for the next meeting, to be held May 18, with provision for necessary sub-committee meetings in the meantime. The committeemen present were: R. C. Cram, Brooklyn Rapid Transit Company, chairman; H. A. Abell, New York State Railways, Rochester; Victor Angerer, Wm. Wharton, Jr., & Company, Easton, Pa.; S. Clay Baker, East St. Louis & Suburban Railway, East St. Louis, Ill.; W. R. Dunham, Jr., the Connecticut Company, New Haven; E. B. Entwisle, the Lorain Steel Company, Johnstown, Pa.; Howard H. George, Public Service Railway, Newark, N. J.; E. M. T. Ryder, Third Avenue Railway, New York, N. Y., and James Budd and F. A. Weymouth, representing C. A. Alden, Bethlehem Steel Company, Steelton, Pa., who was kept away by illness. A telegram of sympathy was sent Mr. Alden by the committee. S. W. Dannatt, Rail Welding & Bonding Company, New York, N. Y., was also present by invitation.

Co-operation and Responsibility

THE following letter was written by H. M. Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, Atlanta, Georgia, to W. D. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees of America, subsequent to the appearance of Mr. Mahon's article in the Feb. 12 issue of the ELECTRIC RAILWAY JOURNAL.

Mr. Mahon has written to Mr. Atkinson that he will answer his letter in the near future. Meanwhile this original letter is printed in the ELECTRIC RAILWAY JOURNAL with the consent of Mr. Atkinson and Mr. Mahon. The letter follows:

GEORGIA RAILWAY & POWER COMPANY
OFFICE OF THE CHAIRMAN
ATLANTA, Feb. 24, 1921.

MY DEAR MR. MAHON: Your article on the street railway problem which appears in the Feb. 12 issue of the ELECTRIC RAILWAY JOURNAL is very interesting. Your statement appeals to me because I am especially interested in the problem, and also because you state the points clearly and simply. In the main I agree with everything you say.

There is one phase of the service-at-cost plan that you do not deal with. This particular phase is the one that has given me most trouble in trying to bring myself to accept the plan. To put it briefly, the question I wish to ask is, how are you going to prevent expenditures, and therefore rates, from spiraling upward in "vicious circles"? It seems to me that this problem must be solved in each case where the plan is adopted. I have general ideas of my own how this could be accomplished, but I am very anxious to have your views. Personally, I doubt whether a supervisory commission or commissioner will solve this question satisfactorily.

In some way the incentive to efficiency must be retained. If all hope of gain, or perhaps a better way to put it is reward, from efficiency is removed, capital cannot be obtained, nor will men of proper skill and ability be obtainable. No matter what our beliefs or theories may be, if the incentive of gain or reward is removed business will die.

The problem the Federal Labor Board is struggling with in Chicago at the present moment is, in a nutshell, nothing but what I have tried to state above. The labor organizations tell the roads if they are losing money to go to the Interstate Commerce Commission and get higher rates. But the rates already are all the "traffic will bear." No matter how much we may protest against it, there is no avoiding the economic law that wages as well as rates must and will come down or go up relatively to the decrease or increase in the purchasing power of the dollar. The value of the services of every individual worker, including you and me, is subject to that law.

Why isn't the present Cummins-Esch law in its general application a service-at-cost plan?

Referring to your idea of co-operation between the public (consumers), the owners and the operators, I agree with you thoroughly. But it has not been worked out practically, so far as my observation goes. If organized labor can be induced to assume completely its just share of responsibility for production to the extent of guaranteeing it with responsibility, I imagine that nearly all the opposition to the "closed shop" on the part of employers will disappear. It is my opinion that the weakness of organized labor is that it does not come out frankly and accept this responsibility. It cannot be avoided in the end, and the fact that it does not accept such responsibility is the source of nearly all the trouble. What I mean is that if organized labor seeks partnership it must assume the responsibility of a partner. It must accept the unavoidable fact that the only source for the payment of wages is production.

I have been hoping for a long time to see you again. I would like to discuss this subject and others with you.

H. M. ATKINSON,
Chairman of the Board.

Controversies Over Car Insurance Eliminated

A NEW form of insurance policy covering rolling stock has this year been negotiated with the insurance companies by T. A. Ferneding, vice-president and general manager Dayton, Springfield & Xenia Railway, Dayton, Ohio. The usual form of policy covers all cars at 100 per cent of their combined value and is known as a blanket policy. In case of loss by fire, when the company has a policy of this kind, there are two positions the insurance companies may take which tend to defer settlement.

If the insurance company establishes on investigation that the insurance carried on all cars was less than 100 per cent of their value, the railway company becomes a "co-insurer" to the extent of the percentage of total value not covered. On the other hand, if the insurance company takes the position that the cars are overinsured, and therefore refuses to pay the full loss on that basis, then the railway company is in the position of having paid premiums on the excess insurance to no avail.

In the new form of policy each car is listed by number with a stipulated value determined by two people and agreed upon in advance by the railway company and the insurance company. This list of car numbers and corresponding values is attached to the policy and made a part thereof. If the value of a particular car is established at $15,000 it is insured at $15,000, and in case of loss the railway company simply makes claim for the loss of certain cars listed by number, and their value is a fixed amount upon which there can be no controversy. The values placed upon the cars are adjusted each year to provide for changing market conditions and deterioration of equipment. Mr. Ferneding thinks that this arrangement will eliminate a lot of unpleasant negotiation and properly insure the railway company against loss or excess premiums.

Congress has increased the annual appropriation for the United States Forest Products Laboratory, located at Madison, Wis., by the sum of $100,000. This will enable the laboratory to extend its researches in the field of wood preservation, etc., many of which are of great value to the electric railway industry. Carlile P. Winslow, director of the laboratory, has issued an expression of appreciation of the active indorsement of the laboratory by its many friends.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Toledo Problems Pressing

Rerouting, Wages and Power All Claim Attention Under Service-at-Cost —Will Check Costs

Toledo has a great deal to think about as a result of the submission of a rerouting plan, suggested wage reductions by the Community Traction Company, and negotiations looking toward the establishment of a proper power rate for the traction company.

FOUR PLANS FOR REROUTING

At a meeting of the board of control Commissioner Wilfred E. Cann presented four suggestions for rerouting which were approved and handed over to the Council for action. One of these would result in the rescinding of a 12-mile speed law and permit speeding up of all cars so as to obtain a 9-mile an hour average rather than 8 as now.

The wage contracts of platform employees and electrical workers expired at midnight on March 31 and at that time no agreement had been reached. It was agreed, however, to maintain the status quo until April 8.

The present wage scale for platform men is 60 cents for those who have been with the company for six months, 56 cents for those in employ three months, and 54 cents for those beginning. The scale suggested by the company and turned down by the men provided for a cut of 2 cents an hour for the old employees and rates of 54 and 50 cents an hour for the other classes. The cost of living in Toledo was shown to have dropped 15 per cent since the 1920 contract was drawn.

It has developed that the Community Traction Company took up as an obligation with the railway property approximately $50,000 of last year's taxes on the railway. Commissioner Cann and the board are attempting to spread this amount over a long period so that operating costs will not be loaded too heavily the first few months. The company also took to itself paving obligations of $185,000 and it is the feeling of the board that this item should be placed in capital account in some way.

POWER ENGINEERS CONFER

The power matter was taken up at a conference attended by Law Director Martin; Commissioner Cann; B. V. Phillips, consulting engineer, Cleveland; Henry Riggs, valuation engineer, Ann Arbor; David Friday, accountant, Ann Arbor; members of the street railway board, Frank Coates, president of the traction company, and Ferd Derge, assistant general manager of the Toledo Railways & Light Company.

The Acme Power Company plant, a Doherty enterprise, not a public utility, supplies 90 per cent of the traction power. If Henry L. Doherty will give permission David Friday and B. V. Phillips will check the costs right back to the coal pile. Then negotiations for a fair rate will begin with arbitration as the final step in the event of failure to agree.

Taxpayer Attacks Cincinnati Service at Cost

Forfeiture by the Cincinnati (Ohio) Traction Company of its fifty-year franchise, granted by the Rogers law in 1896, was demanded by Attorney Albert S. Alcorn in a taxpayer's suit filed in Common Pleas Court on March 29. The Cincinnati Street Railway, from which the Traction Company leases its lines and rights, also is made a defendant. The suit charges that the Traction Company has violated its franchise in that more than 5 cents is charged for a ride in violation of the provisions of the Rogers law. Attorney Alcorn, explaining this provision, said that he believed the revision ordinance, known as the service-at-cost plan, was unconstitutional. The Rogers law, he explained, provides for a decrease in fare only.

The plea asserts also that the companies have decreased the percentage tax on gross earnings which they were required by the terms of the fifty-year franchise to pay to the city. Refusal to pay car license fees required by the Rogers law also is charged in the suit.

Other charges in the suit against the companies are that they have sold steel rails and other commodities to individuals and corporations, thus defrauding the city out of $400,000.

Attorney Alcorn says that on Feb. 17 he requested City Solicitor Saul Zielonka to file suit. This he supplemented with additional reasons to the solicitor on Feb. 21 and March 7, but Mr. Zielonka has refused to bring action so he filed it himself as a taxpayer. Mr. Alcorn declares that the Cincinnati Traction Company is an Ohio corporation organized "for the purpose of furnishing a corporate name in which to lease from the Cincinnati Street Railway its lines of street railway in the City of Cincinnati, under what is known as the Rogers fifty-year franchise law."

Elsewhere in this issue reference is made to the resignation of C. P. Taft as first vice-president and director of the Ohio Traction Company and to the withdrawal of W. C. Culkins as City Street Railway Director to become executive secretary of Cincinnati Chamber of Commerce.

Another Solution Offered

Representatives of City of New Orleans Advance New Plan with $35,000,000 Valuation Figure

A rift has finally been made in the clouds of uncertainty that have hovered over the prospective settlement of the troubles of the New Orleans Railway & Light Company. At a meeting on March 30 of the Mayor, the Commissioners of the Commission Council and the members of the citizens' advisory committee a tentative plan was submitted by the representatives of the city looking to possible solution of existing entanglements.

Under the plan it is proposed that:

1. A valuation of $35,000,000 be placed on the entire property of the New Orleans Railway & Light Company, divided as follows:

New Orleans railway proper....	$20,000,000
Electric light and power plant..	8,000,000
Gas plant	7,000,000
Total	$35,000,000

Upon this valuation it is estimated by the Mayor and the Commission Council that the returns must be $2,150,000, allowing 7 per cent upon $5,000,000 of new money which it is estimated will be needed for rehabilitation.

REDUCED FARES SUGGESTED

2. The rate of fare after April 21, 1921, when the 8-cent fare expires by limitation, must not exceed 7½ cents; with reductions every six months thereafter of one-half cent until a "normal" level is reached.

3. The rates for gas and electricity must be cut proportionately and recommendations made for the acquisition of the gas plant at the valuation of $7,000,000.

4. Allowances must be made for proper reserves for replacements.

5. No distribution of undivided profits of the company shall be permitted without approval of the Commission Council.

6. No future issues of securities shall be permitted without the consent and approval of the Commission Council.

In anticipation of the probable purchase of the gas plant an ordinance is now being prepared by the City Attorney for submission to the Constitutional Convention, giving the city permission to issue bonds against any public utility.

Reports dissenting from the conclusions reached by the general committee have been filed with Judge Foster, of the federal court, by Walter B. Spencer, Leigh Carroll and Robley D. Stearns.

More Wage Cuts Proposed

Employees of Rochester, Syracuse and Utica Lines Solicited to Accept 1918 Rates

Proposals have been made by the New York State Railways for wage cuts of as much as 25 per cent on May 1 among trainmen employed on the lines of the company in Rochester, Syracuse, Utica and other cities. The proposed cuts are: City lines, from 60 cents an hour to 45; interurban, 62 to 47; third rail, 65½ to 50½.

In his letter to the men through Chairman Noon, President Hamilton of the New York State Railways says:

> After a most careful consideration of all interests involved the public, the employees and the company, and inasmuch as all authentic statistics show that the cost of living today has reached a point below where it was in July, 1919, and the general tendency indicates a further reduction in the price of clothing, foodstuffs and other commodities which go to make up living expenses, we feel that the wages as fixed by the National War Labor Board for motormen and conductors under date of July 31, 1918, would be fair to all parties interested under this contract.
>
> The working conditions under the present contract are an accumulation of years and have become so cumbersome and burdensome that it is impossible for the company working under them to furnish the best service to the public, and for that reason it has decided upon the changes set forth in the revised agreement submitted herewith.
>
> This company has increased the rate of wages to its employees 126.41 per cent over that paid at the beginning of the world war, while the increase in gross revenue has been only 37.65 per cent. On account of this condition the company was obliged to forego the payment of a return to its stockholders, never having previously paid a fair return to the people whose money is invested in this property.
>
> This condition cannot continue, not alone from the fact of the non-payment of dividends, but that the credit of the company must be restored and maintained at any cost if it is to meet the capital expenditures necessary to perform its first and principal duty, viz: Service to the communities through which it operates.
>
> I feel that in view of the importance of this subject a meeting of the representatives of the employees and the officials of the company should be held at the earliest possible moment, and would suggest April 4, 1921, in my office at Rochester, if convenient to the officers of the Amalgamated Association, at which time the whole matter can be discussed.
>
> I want the employees to feel that the company will exercise the same spirit of fairness that has been displayed in the past, and after a full and frank discussion of the whole matter we believe an adjustment can be reached which will be fair to the employees, to the public and to the company.

President Hamilton's letter does not specify the working conditions which have become "so burdensome and cumbersome."

These are the roads whose employees are asked to go back to where they were prior to May 1 of last year and accept practically the wage scales put in effect by decision of the war labor board in 1918:

New York State Railways, Syracuse, Rochester, Utica and connecting lines owned by the same company.

Rochester & Syracuse Railroad, connecting the two cities and serving communities between.

Auburn & Syracuse Electric Railroad, connecting the two cities and also covering the local lines in the city of Auburn and to Owasco lake.

Empire State Railroad Corporation, connecting Syracuse with Oswego, and including the Oswego city lines, and the Auburn & Northern, an 8-mile route connecting with the Rochester & Syracuse at Port Byron and with the Auburn & Syracuse at Auburn.

The Syracuse Northern (the South Bay road).

Prospects appeared to be bright for the settlement of the wage matter in conference after the first meeting on April 4. Definite findings, however, are not expected to be reached for a week. Meanwhile little information is expected to be available to the public. Mr. Hamilton is quoted to the effect that if an agreement can not be reached in conference then points in dispute will be arbitrated. The matter must of course be submitted to the men for final vote.

Schenectady Company Would Cut Wages

The new wage scale proposed by the Schenectady (N. Y.) Railway makes a reduction of 25 per cent from the present scale of 60 cents an hour. The new rate, which is to go in effect on May 1, is the same as the men were receiving a year ago.

The company was able to grant an increase about a year ago when the Common Council waived franchise rights temporarily allowing the company to petition the Public Service Commission for an increase from 6 to 7 cents in local fares and other increases on interurban lines.

There is an arbitration clause in the present agreement. Under the provisions of the contract the company had to present the draft of the new agreement thirty days before the old agreement expired.

Indiana Line Unable to Make Improvements

The railroad committee of the City Council of Evansville, Ind., has reported to the Council that Frank J. Haas, vice-president and general manager of the Southern Indiana Gas & Electric Light Company, has refused to extend the Howell line as requested by the committee. Mr. Haas said that the proposed extension would cost the company $30,000 or more and that the company could not afford at this time to make the improvement.

The company has also notified the Board of Public Works of Evansville that it will not make street improvements as requested by the board. Mr. Haas contends that the improvement of the portion of the streets between the rails does not benefit the railway and that the property owners along the street should pay for it. Mayor Bosse would "throw the tracks off the street and put in a bus line." The Mayor is said to have announced that he had received a letter from Glenn Van Auken, of the Public Service Commission, in which he advised that the City Council pass an ordinance demanding the company meet certain requirements of service.

Railway Versus Motor Bus

Canadian Commission Hears Experts on Relative Reliability for Use Between Toronto and Hamilton

James E. Richards, manager of the London & Port Stanley Railway, in giving evidence before the Ontario (Sutherland) Hydro-Radial Commission at Toronto the last week in March, as to the practicability of the proposed high-speed line between Hamilton and Toronto, submitted the following figures showing the growth of traffic:

Year	Number of Passengers	Amount of Freight
1917	726,799	$147,826
1918	842,641	143,608
1919	958,587	188,187
1920	1,002,034	210,239

At the time of electrification of the line it was estimated that the business could be done with four motor cars and five trailers; the railway was now using seven motor cars and ten trailers.

Mr. Richards stated that 97½ per cent of the business was competitive and could be handled by the Canadian Pacific, Grand Trunk, Michigan Central, Wabash and Pere Marquette steam roads, and in reply to a question stated that the business came to the electric railway because of service.

The total earnings now were $25,781 per mile, of which $11,017 were passenger receipts.

On the following days, March 30 and 31, Walter Jackson, consulting engineer, Mount Vernon, N. Y., testified. He stated that the cost of motor bus transportation was just about double that of electric cars operated over routes of reasonably dense traffic. For long-haul freight service the cost of common-carrier motor trucking was just about twice as much as many operators imagined. Even in the comparatively dense traffic district of New England there had been many failures. Mr. Jackson submitted figures showing that a 5-ton truck going 80 to 100 miles a day costs to operate about 60 cents per mile, or $60 a day, including the cost of warehouses, business solicitation, etc.

A motor bus company could not possibly carry passengers at the proposed hydro-radial rate of 2¼ cents per mile; it was an impossible rate no matter how much business was secured. Besides it could not possibly meet the schedule of a rapid transit line.

On Friday Charles A. Cheval, auditor of the International Railway, operating between Buffalo and Niagara Falls and other points, was a witness. The new 17-mile high-speed line between these cities cost $225,000 a mile, of which $180,000 was for right-of-way and structures, while power equipment and general cost amounted to $45,000 a mile. The new line enabled the company to cut thirty minutes off the time run, reducing it to one hour.

T. H. Stoffel, of the Westinghouse Company, stated that American express companies were doing away with motor trucks in smaller towns and replacing them with horse-drawn trucks.

Reports on Abandoned Lines

Massachusetts Utilities Department Not in Favor of State Ownership—Recommends Local Sudsidy

In reply to a set of questions relating to abandoned electric railway lines propounded to it by the State Legislature, the Massachusetts Department of Public Utilities has submitted a report the most striking feature of which is a firm stand in favor of "home rule" by local communities as regards the financial support or subsidy of weak lines and against a general policy of state ownership or aid, and secondly the abolition of the commutation tax and charges for highway maintenance.

370 MILES ABANDONED

The department considered it impossible to pass a properly considered specific judgment on the first question which asked for a determination as to what lines, whether now in operation or not, are necessary for the public welfare and convenience.

The report begins with a recapitulation of the discontinued lines in the Commonwealth. It shows that a total of seventeen electric railways have abandoned operation of 371.27 miles of track.

Referring to their abandoned lines the department states that some of them ought never to have been built, some ran to parks and other places no longer popular and some of them paralleled near-by railroad lines and were never a vital factor in transportation. The majority of the lines, however, were valuable arteries of travel and in many cases auto buses have been substituted for them. In the opinion of the department the value of these lines from the standpoint of the economic and social welfare of the public is a local question, best left for individual settlement to the communities most directly concerned.

The problem, however, involves not only the lines already abandoned, but the possibility that the future may see still further suspensions. This in the opinion of the department is the more serious part of the problem.

However, an optimistic note is sounded in the statement that the critical condition of the railways is largely, though by no means wholly, due to the war, and that it is not unlikely that very far-reaching economic changes may take place in the near future which will relieve the situation of some of its most acute phases.

EXTENSION OF EMERGENCY ACT RECOMMENDED

The principal legislation recommended is an act to enlarge and extend the emergency war-time statute which permits cities and towns in Massachusetts to contribute to the support of street railway lines. In this connection, the department states:

> We are aware of no reason why any community should not, if it deems it necessary for its welfare and convenience after careful consideration of the question, restore or prevent the discontinuance of street railway lines in its limits, either by acquiring such lines and running them as a public venture or by contributing toward their support from taxes. The question undoubtedly presents difficulties, but we cannot agree with one of the speakers who urged at a hearing on this matter that its complexity is a reason why the Commonwealth should assume jurisdiction over and responsibility for all the street railway lines in Massachusetts.
>
> If a street railway serves one particular community alone, the question of the discontinuance of its lines in that locality seems to us a question best dealt with by the particular people served. At any rate, we feel clear that this method should be given a fair trial before any more extensive experienment be made in the direction of the Commonwealth's assumption of obligation.
>
> This seems to us to afford not only the best measure of the necessity of such lines, but also the best machinery for meeting the situation in each locality. We believe, moreover, that the assumption of local burdens, rather than their abandonment, tends best toward the development of democratic institutions.

Other legislation was recommended dealing with cases where several communities may be involved, and one or more refuse to agree to the plan. A proposed act was also submitted, intended to abolish all charges for construction, maintenance or repairs to highways or bridges, and to abolish the commutation tax at present paid by the street railways.

Little Change in Albany Strike Situation

The strike of the employees of the United Traction Company, Albany, N. Y., entered upon its tenth week on April 2. The company has not yet opened all its lines and no move has been made by the men to bring the situation to a close, except the court proceedings to compel arbitration. The notice of appeal filed on April 2 in the Rensselaer county clerk's office by attorneys for the company from the order of Justice Howard to try the arbitration case on April 4 is expected to prolong the litigation.

In the meantime the company is going ahead hiring more permanent employees and the former places of the employees now on strike are gradually being filled.

The jitney situation still remains undecided, no action having been taken by the municipal authorities of Albany and Troy. The Supreme Court through Justice Hinman has stated its attitude as to the further operation of these vehicles in competition with the United Traction Company, declaring that their continued running without municipal consent or authority from the Public Service Commission is a violation of the penal law.

Officers of the railway conferred on April 2 with Mayor Watt and Corporation Counsel McManus regarding action intended to be taken by the city against the jitneys in view of the court's decision. It is understood the traction company is ready to supply additional affidavits for the purpose of enjoining other jitney owners and drivers from operating.

Chew as You Ride.—The Twin City Rapid Transit Company, Minneapolis, Minn., is testing candy and gum slot machines on four interurban cars.

Mr. Allen Arbitrator

Union Officials Reject Proposal of Cleveland Railway for Wage Reduction and Other Changes

Negotiations looking toward a 20 per cent reduction in pay for motormen and conductors on May 1 are now on between the Cleveland Railway and officers of the local union.

On Feb. 1 the Cleveland Railway made a 10 per cent reduction in pay for all officers and employees except the trainmen, with whom there is an agreement that does not expire until May 1. At that time John J. Stanley, president of the company, issued bulletins to the trainmen informing them that he would cut their pay 20 per cent on May 1 and also seek elimination of the war-time emergency allowances regarding overtime, spread of runs, etc.

Cleveland motormen and conductors now get 70 cents an hour for the first three months service, 73 cents an hour for the next nine months and 75 cents an hour after the first year.

In a formal demand on the union Mr. Stanley announces a cut in wages to 55 cents an hour for the first three months, 58 cents an hour for the next nine months and 60 cents an hour after the first year. This was the pre-war standard of wages. Mr. Stanley also demands the setting aside of the article in the company's agreement with the union making certain allowances for overtime, spread of runs, etc. He likewise insists upon the elimination of Sec. 1, of the agreement providing that all trainmen employees of the company must join the union and making provision for having the company collect union dues.

Officials of the union have refused to meet Mr. Stanley's demands. Instead, they have suggested that the matter be arbitrated by the street railway committee of the City Council.

In reply to this Mr. Stanley has informed the union that the present agreement provides a method for arbitration of the dispute. This calls for appointment by the company of an arbitrator, appointment by the men of an arbitrator, these two to select the third, or failing, to have the third man named by Federal Judge Westenhaver.

Mr. Stanley has named as his arbitrator C. Loomis Allen, vice-president and general manager of the Syracuse & Suburban Railway.

Since the developments just noted the conductors and motormen have offered to accept a reduction in pay of 6 cents an hour starting May 1. This offer was made to Mr. Stanley, by officials of the union late on April 4 during the course of negotiations over Mr. Stanley's demand for a wage reduction of 20 per cent. Mr. Stanley rejected the men's offer, insisting that all his demands be arbitrated in accordance with the contract between the company and the union. His demands are:

1. Reduction in basic pay of approximately 20 per cent to a maximum of 60 cents an hour.

2. Abolition of additional pay for Sunday, night and other difficult runs.
3. Abolition of the closed shop agreement.

A year ago the men refused to arbitrate the question of the closed shop and a strike resulted.

Officials of the union made their offer of a wage reduction of 6 cents an hour after Mr. Stanley had turned down an offer to accept a reduction of 3, 4, and 5 cents an hour. The officials of the union in making the offer explained that they would have to have the offer ratified by members of the union as they have so far received no authorization from members to make any offers.

A mass meeting of the members of the union has been called for April 13.

D. U. R. Defeated Again

Plea of Private Line for Service-at-Cost Fails to Impress Voters—Vote Very Heavy

With the preliminary reports received relative to the votes cast on the April 4 election on the two ordinances affecting the railway situation in Detroit, the Detroit United Railway's Service-at-Cost ordinance appears to have been defeated while the city ordinance providing for the purchase by the city of certain Detroit United Railway lines was carried by a large majority.

The first reports showed that the municipal ordinance appeared to be receiving support in every district of the city, none of the early precincts heard from opposing the plan to purchase the lines from the company. Based upon the first count of about one-tenth of the votes cast, coming from widely scattered precincts throughout the city, the company's ordinance appears to have been defeated by a vote of two to one.

Official figures announced on April 5 showed that every municipal question submitted to the voters at the election Monday had carried by a large majority. The piecemeal purchase plan carried by 65¼ per cent vote, while the service-at-cost ordinance failed to obtain more than 35½ per cent affirmative vote. The vote on the service-at-cost ordinance was 52,918 for and 92,036 against. On the purchase ordinance the figures were, 96,539 for and 50,704 against.

Before the election on the service-at-cost ordinance, Elliott G. Stevenson, attorney for the Detroit United Railway, stated that the company has from the first conceded that the company's service-at-cost ordinance would require a 60 per cent affirmative vote. The question as to whether or not the three-fifths majority of the votes cast would be required to carry the ordinance was raised by the chairman of the election commission. It was pointed out that there was no expenditure of money involved and the question was raised as to whether the ordinance could be interpreted as a franchise. If it is a franchise then the 60 per cent majority is required.

Members of the commission stated that they believed that the Detroit United Railway had not asked for a ruling on the question. A decision by the Attorney General's Department was sought by the Chairman of the Election Commission. The Corporation Counsel declared that a 60 per cent majority would be necessary to carry the measure.

Large London Workshops

Both the London underground electric railway companies and the London General Omnibus Company are erecting large workshops for heavy repairs and overhaul on what has hitherto been market-garden land near Oction Town Station in the western outskirts of the metropolis. The policy is one of conconcentration and economy instead of having the work done as at present in a great number of smaller shops scattered over the London area. The railway companies' shops and yards will occupy about 64 acres, while the omnibus company has about twenty-six acres. The former set of shops and equipment will cost about £20,000, but large oconomies in operation are expected. It is hoped these shops will be ready early next year, while those of the omnibus company are to be finished in July next.

News Notes

Fire Started to Hide Crime. — The ticket office of the Niagara, St. Catharines and Toronto Railway, Niagara Falls, Ont., was recently gutted by fire. Two youths formerly employed as ticket agents have been placed under arrest charged with the theft of $1,000 of the company's funds, and they are alleged to have confessed that they robbed the company and then set fire to the ticket office to hide the crime.

Utility Rate Bill Opposed. — W. H. Johnson, vice-president of the Philadelphia (Pa.) Electric Company, has expressed disapproval of bills introduced in Pennsylvania giving the Public Service Commission power to suspend rates pending decisions. This and other matters of current interest were touched upon by Mr. Johnson at the Eastern Geographical section meeting of the Pennsylvania Electrical Association in Philadelphia on Feb. 24.

Home Rule Bill Lost.—The Oklahoma House in the closing days of the session killed on final roll call House Bill No. 178 which proposed to confer upon cities and towns jurisdiction over rates charged by public utilities. Had the bill passed it would have deprived the Corporation Commission of its control over rates for gas, electricity, water, telephones and street railway service, and would have turned this power over to the various city councils, city commissions and town boards of the state.

Another British Tidal-Power Scheme.—A report is now being prepared in Great Britain on a scheme to utilize the tides at Walney Island to supply electrical energy to the Barrow district of Lancashire, with its great industrial development. As with the similar project for the River Severn, even if all engineering difficulties were overcome, the cost of the enterprise would, conservative authorities think, be likely to prove prohibitive.

$4,000,000 Bridge Proposed.—Governor Warren T. McCray of Indiana has signed a bill authorizing the Governor to appoint a commission to co-operate with a similar commission to be created by the State Legislature of the state of Kentucky, the two commissioners to work out plans for the building of a bridge over the Ohio River at Evansville, Ind. The proposed bridge will be used for traction lines and railroads.

Wage Agreement Renewed Unchanged.—The employees of the Trenton & Mercer County Traction Corporation, Trenton, N. J., will receive the same wages for the coming year as have been paid. This is provided in the new working agreement between the men and company signed on April 2. Employees of cars where two men are used receive 50 cents an hour, while operators of one-man cars are paid 55 cents. The men have asked the company to change the "tripper" schedules.

Program of Meeting

International Railway Congress

Announcement has been made that the ninth congress of the International Railway Association will be held in Rome, Italy, from April 19 to May 1, 1922. Section VIII is that of electric traction. Seven papers will be presented on this subject, the topics being divided up among the different countries. The names and titles of the speakers follow:

Holland and Great Britain—J. W. W. Van Loenen Martinet, chief of electric traction for the Netherlands State Railways. Utrecht.

Belgium—Ernest Gerard, General honorary secretary to the Minister of Railroads, Marine, Posts and Telegraph in Belgium; Manager of the National Light Railway of Belgium, Brussels.

Denmark, Sweden and Norway—Mr. Ofverholm, chief of the Electro-Technical Bureau of the Swedish State Railways, Stockholm.

Italy—Alfredo Donati, engineer, chief of the special Electrification Commission for the General Management of the Italian State Railroads, Rome.

Switzerland—Emile Huber, chief of electrification of the Swiss Federal Railways, Berne.

America—George Gibbs, chief engineer of electric traction, Long Island Railroad, New York.

Other countries—Mr. Sabouret, chief engineer of technical service of the Orleans Railroad, Paris.

Financial and Corporate

Omaha Must Have More

Revenues Must be Increased or Expenses Decreased if Receivership Is to Be Avoided

The Omaha & Council Bluffs Street Railway, Omaha, Neb., is face to face with the necessity of reducing wages or increasing the rate of fare. The whole situation will be unfolded before the State Railway Commission, at Omaha, Neb., beginning May 2. Considerable interest is manifested in this forthcoming hearing at which the company will place its facts and figures on the table, feeling confident at this time that the real status of its financial affairs will result in the needed relief.

The case harks back to May, 1918, when the company first applied to the commission for an increase of fare, from 5 cents to 6 cents. The case involved many ramifications, such as a demand by the men for increased wages and a threatened strike. The commission, on Aug. 10, 1919, issued a temporary order, allowing the company to charge a 7-cent rate, with four tickets for 25 cents. This fare has been in effect since that date. In connection with that order, the commission directed the company to prepare a physical valuation report. This has been completed and will be introduced on the opening day of the hearing this month.

MANAGER FEARFUL FOR FUTURE

R. A. Leussler, vice-president and general manager of the company, points out that in 1920 his company lacked $31,586 of earning enough to pay the 5 per cent preferred stock dividend, and he added that no common stock dividends have been paid by the company for three years. In 1919 the earnings yielded $16,000 over the payment of preferred stock dividends. He further stated that the net earnings in 1920 were $48,816 less than in 1919.

During August, 1919, the wages of motormen and conductors were increased 10 cents an hour and during November of the same year another increase of 2 cents was allowed making a total of 12 cents an hour increase to the men since the fall of 1919. The present scale of wages is from 53 to 57 cents an hour.

"It is no secret," said General Manager Leussler, "that the company must increase its income or decrease operating expenses. We are going before the State Railway Commission on April 25 and let that body determine what is necessary. We must have an increase or go into the hands of a receiver. It is for the commission to say what the rate of fare should be."

The company states that it paid $2.90 per ton for coal during 1915 and that it paid $6.90 per ton in 1920. The total amount of taxes paid by the company last year was $427,861. It is further noted by the company that fares of 10 cents are being paid in 112 cities.

The City Council of Omaha has directed W. C. Lambert, corporation counsel, to represent the city at the hearing before the State Railway Commission and to engage necessary expert assistance.

$18.11 per Share Earned by North American Companies

Excellent results are shown in the thirty-first annual report of the North American Companies for the calendar year 1920 in spite of the difficult conditions under which all public utilities have operated in the last few years.

Gross earnings of the various companies amounted to $39,611,162, an increase of 30.64 per cent over 1919; balance for depreciation, common dividends and surplus was $5,396,288, an increase of 17.81 per cent, equivalent to $18.11 per share of North American stock before reserve, as compared with $15.38 in 1919.

A significant feature of the 1920 report is the small proportion, about 13 per cent, of net income of subsidiaries derived from electric railways operation. More than 71 per cent of net was derived from electric and heating, and the balance from coal and gas operations. This showing and the fact that the companies' entire investment in the United Railway, St. Louis, is carried on its books at $1 dispel any impression which may have prevailed that railway operation is the principal source of subsidiary net earnings.

Growth of the railway business of the Milwaukee Electric Railway & Light Company during the year is indicated by increases of 5.67 per cent, 13.34 per cent, and 13.86 per cent respectively in revenue passengers, car miles operated and car hours. During the year the Milwaukee Electric Railway & Light Company leased from the Wisconsin General Railway ninety-nine new city cars and forty one-man safety cars. The lease was assigned to the Fidelity Trust Company, Philadelphia, as trustee and the latter issued $1,090,000 of ten-year 8 per cent sinking fund equipment trust gold certificates, payment of the par value and dividends of which have been guaranteed by the railway and light company.

Under orders of the Railroad Commission of Wisconsin the ticket rate of fare within the single fare area of the city of Milwaukee was increased in June, and in October rates for electric and heating service were also increased.

Merger Actively Urged

Conference of Railway Representatives with Public Utility Members Suggested at Washington

In the hope that some plan may be evolved for the voluntary merging of the two railways in the District of Columbia, the Commissioners of the District have suggested that two representatives of the Capital Traction Company and two representative of the Washington Railway & Electric Company be appointed to meet with the Public Utilities Commission in an effort to determine how the companies may be consolidated.

ENABLING LEGISLATION DRAWN

It was revealed that the District commissioners practically have agreed to urge Congress to pass the Wood bill which would make the merger compulsory. That bill would substitue for the present tax of 4 per cent on the gross receipts of the railways an excess profits tax of 50 per cent of the net earnings in excess of a 6 per cent return on the amount at which the property is valuated. This would have the effect of relieving the Washington Railway & Electric Company from the payment of any taxes since its earnings probably would not exceed 6 per cent. The Capital Traction Company earns 10 per cent on its valuation.

The Wood bill also provides that the railways are to be merged before the Potomac Electric Power Company is taken over. The bill further relieves the railways from the payment of the salaries of crossing policemen and relieves them of the payment of certain paving charges.

These matters were discussed on April 4 at a conference at the capitol attended by members of the Senate and House committees on the District of Columbia, by the District commissioners and by representatives of the railways.

W. C. Kutz, chairman of the Public Utilities Commission, declared that the commission is opposed to the merger of the Washington Railway & Electric Company and the Potomac Electric Power Company unless it merely is a preliminary step toward the consolidation of the two railways. He expressed the opinion that a merger must be brought about if the railway fare is to be less than 8 cents.

MR. HAM SEES FARE REDUCTION

William F. Ham, president of the Washington Railway & Electric Company and of the Potomac Electric Power Company, declared it would be possible to reduce fares to 7 cents if the power company and the Washington Railway & Electric Company merge and the power company is allowed to charge 10 cents a kilowatt hour for electricity. Mr. Ham also contended that it is an injustice to the railways to require them to pay the salaries of crossing policemen and to pay for paving between tracks and for 2 ft. on each side of the outer rail.

Municipal Railway Falling Behind

$237,797 Lost by City Road on Basis of Comparison of Charges Borne by Private Company

The Municipal Railway, San Francisco, in its annual report for the year ended June 30, 1920, issued recently, shows interesting results. Although it earned $43,000 per mile of revenue track, or more than any year since Exposition Days in 1915, the cost of operation ate it all and more, so that actually operations for the year were conducted at a loss.

NET earnings from operations, according to the method of bookkeeping used on the municipal lines, actually showed a deficit of $6,350. If the comparison charges required by the charter, as shown in the table, are considered as being proper for a basis of comparison with privately owned companies that have to pay such taxes, the loss for the year would amount to $237,797. There was, however, a surplus of $100,110 on operation during previous years, so that the deficit under this basis of comparison would be but $137,687.

Incidentally it might be said that the Municipal Railway, with earnings from operation of $43,000 per mile of revenue track on a single-track basis, is exceeded by only one other strictly overhead trolley system in the country that operated on a 5-cent flat fare basis for the year ended June 30, 1920. Some other companies operating on a 5-cent fare basis were the United Railroads, San Francisco, with earnings of $32,700 per mile, the Brooklyn City Railroad with $46,000, the Louisville Railway with $28,000 and the Southern Boulevard Street Railway (New York) with $31,420 per mile of track.

STATISTICAL INFORMATION—MUNICIPAL RAILWAY OF SAN FRANCISCO

Year Ended June 30:	1920	1919	Per Cent Change
Track owned and operated (miles)	57.97	58.23	*0.436*
Track owned and operated cojointly with United R.R. (miles)	5.15	5.15	......
Carhouse tracks and sidings and unused spurs (miles)	4.00	3.95	1.265
Total (miles)	67.12	67.33	*0.312*
Average total miles of single track operated at end of year	63.12	63.38	*0.410*
Revenue car-miles	7,182,475	....	.....
Revenue bus-miles	236,797	....	.....
Total revenue miles	7,419,272	7,212,763	2.86
Revenue car-hours	....	....	....
Revenue bus-hours	....	....	....
Total revenue hours	795,578	779,746	2.03
Revenue passengers on cars and buses:			
Five-cent cash	53,645,764	47,524,125	12.90
Five-cent government ticket	66,904	69,262	*3.41*
Two and one-half cent school ticket	639,894	597,483	7.10
Two cent revenue transfers	600,296	856,166	*29.80*
Total revenue passengers	54,952,858	49,047,036	12.10
Free transfer passengers	10,757,504	9,836,127	9.34
Free passengers, employes, police, firemen, etc	458,884	458,090	0.17
Total car and bus riders	66,169,246	59,341,243	11.50

INCOME STATEMENT OF SAN FRANCISCO MUNICIPAL RAILWAY

Year Ended June 30:	1920	1919	Per Cent Change
Revenue from transportation	$2,702,289	$2,391,176	13.00
Revenue from other railway operations	10,147	10,222	*0.73*
Total railway operating revenue	$2,712,436	$2,401,398	12.96
Ways and structures	102,130	63,331	61.30
Equipment	186,947	147,446	26.75
Power	348,383	327,687	6.32
Conducting transportation	1,293,309	1,045,704	23.70
Traffic	666	264	153.00
General and miscellaneous	94,432	70,612	33.70
General and miscellaneous (comparison charges)	4,912*	10,904	*55.00*
Depreciation (14 per cent of passenger revenue)	378,429	334,867	13.00
Accident reserve (4 per cent of passenger revenue)	108,122	95,676	13.02
Total operating expenses	$2,517,330	$2,096,491	20.03
Net operating revenue	195,106	304,907	*56.30*
Taxes (comparison changes required by charter):			
State franchise (5.25 per cent operating revenue)	142,488	126,155	12.95
Municipal franchise (3 per cent passenger revenue)	81,092	71,757	13.00
Municipal car license ($15 per car)	2,955	2,955	......
Federal taxes (1 per cent net income)	....	....	......
Total taxes	$226,535	$200,867	12.85
Operating income	*31,429*	104,040	*129.8*
Non-operating income	27,405	22,248	23.15
Gross income	*4,024*	126,288	*103.2*
Bond interest	233,773	243,093	*3.84*
Net income transferred to profit and loss	*237,797*	*116,805*	103.7
Surplus at beginning of year	100,111	216,916	*77.4*
Surplus at close of year	*137,686*	100,111	*237.80*

* Nothing allowed for legal and office expense.

The appended tables really speak for themselves, but in order to determine what became of all the money earned comparative figures are printed from the report of the United Railroads, San Francisco, for the same period.

Banks in Indiana Boom Utilities

The Fletcher American National Bank, Indianapolis, Ind., has been running a series of advertisements in the newspapers telling facts about the city and emphasizing the importance of utility companies in community life. The theory of the bank offering these advertisements is that anything that is good for the city is good for the banking business.

The advertising has attracted considerable attention, but no more than a series published by the First & Hamilton National Bank of Ft. Wayne,

COMPARISON OF OPERATIONS —YEAR ENDED JUNE 30, 1920

	United Railroads of San Francisco					Municipal Railway of San Francisco				
	Actual	Per C.-M. Cents	Per C.-H.	Per Cent of Operating Revenue	Per Cent of Operating Expense	Actual	Per C.-M. Cents	Per C.-H.	Per Cent of Operating Revenue	Per Cent of Operating Expense
Passenger revenue	$8,938,987	34.85	$3.08	99.30	......	$2,702,289	36.41	3.399	99.63	.....
Revenue from other railway operations	63,124	.34	..02	0.70	....	10,147	.14	.013	.37	.....
Total operating revenue	$9,002,111	35.19	$3.100	100.0	......	$2,712,436	36.550	3.412	100.00	.....
Way and structures	423,853	1.651	$0.145	4.69	6.62	$102,130	1.374	$0.128	3.76	4.06
Equipment	548,955	2.140	.189	6.09	8.58	186,947	2.520	.235	6.90	7.44
Depreciation	(a)	......	......	......	......	378,429	5.099	.476	13.98	15.08
Total maintenance	$972,808	3.791	$0.334	10.78	15.20	$667,506	8.993	$0.839	24.64	26.58
Power	1,357,225	5.300	.467	15.05	21.20	348,383	4.700	.438	12.86	13.87
Conducting transportation	3,471,854	13.550	1.194	38.55	54.20	1,293,309	17.420	1.628	47.65	51.40
Traffic	....	......	......	......	......	666	.009	.001	.03	02
General and miscellaneous	....	......	......	......	......	202,554	2.730	.254	7.49	8.06
Add general miscellaneous comparison charge	....	......	......	.....	......	4,912	0.066	.006	0.16	0.19
Total general and miscellaneous	$695,874	2.720	$0.240	7.72	10.87	$207,466	2.796	$0.260	7.65	8.25
Credit transportation for investment	*94,463*	*0.368*	*.032*	*1.05*	*1.47*	....	......	......	......	.....
Total operating expenses	$6,403,298	25.000	$2.205	71.18	100.00	$2,517,330	33.918	3.166	92.83	100.00
Net operating revenue	2,598,813	10.190	.895	28.82	40.60	195,106	2.632	.246	7.17	7.76
Taxes	513,200	2.005	.176	5.17	8.02	226,535	3.058	.284	8.36	9.02
Net earnings	$2,085,613	8.185	$0.719	23.65	32.58	*$31,429*	*0.426*	*$0.038*	*1.19*	*1.26*
Revenue miles	25,610,023	......	8.84	......	......	7,419,272	......	9.32	......	.....
Revenue hours	2,906,503	......	......	......	......	795,578	......	......	......	.....

(a) Included in two previous maintenance accounts.

Ind. This bank has recently printed a series of twenty advertisements under the heading, "For Greater Ft. Wayne." Mr. Warden, president of the bank, commenting on the "ad," said that the bank believes that it is essential to the growth of Ft. Wayne that people not only take a pride in their public utilities but that they understand better that these utilities must have an adequate return on the investment in order to operate soundly.

Reports of Clark Properties Summarized

Corporations under the E. W. Clark management, Philadelphia, Pa., have reported for the year ended 1920. The Commonwealth Power, Railway & Light Company, controlling properties in the Central West, shows a balance of $797,738 available for renewal, dividend requirements, etc. This is 40 per cent less than the balance of the company for 1919. This decrease is attributed to the increase in wages and to the advance in the cost of coal. Among the other companies reporting are the Bangor Railway & Electric Company, Nashville Railway & Light Company, East St. Louis & Suburban Company, Portland Railway, Light & Power Company and the Cumberland County Power & Light Company. The results of operation of these companies are shown in the accompanying table.

The most appreciable increase in balance was shown in the report of the East St. Louis & Suburban Company where the surplus for 1920 was greater by 5,000 per cent than that of 1919. On the other hand the Commonwealth System showed the greatest decrease in balance. In the case of this company the change amounted to 40 per cent.

Allowances for depreciation were increased materially in the cases of three companies. The Bangor Railway allowed $66,742 for depreciation for 1920 against $58,590 for 1919. The East St. Louis & Suburban Railway allotted $359,417 for depreciation in 1920 against $274,139 for the twelve months of 1919. The Portland Company included in its expenses for 1920 $242,002 for depreciation as contrasted with $257,727 for the same period a year ago.

Actual Worth Valuation

Governor Miller Says Franchise and Going Value Will Not Be Allowed in Readjustment

Frederick L. Cranford, chairman of the Transit Committee of the Brooklyn Chamber of Commerce, has received a letter from Governor Miller of New York in which he states the actual value of the property of the traction companies in New York, and not their franchises and going value, will be considered in any plan of reorganization undertaken by the Transit Commission to be appointed under the traction bill signed recently.

The Brooklyn Chamber of Commerce, through Chairman Cranford, sent Governor Miller a letter on March 16, in which the statement was made that although through the Governor's action the railway matter would be treated as an economic problem apprehension in the minds of the public revolved about three points:

1. The personnel of the commission which it is proposed to create;
2. The possibility of an increase in the present rate of fare;
3. The valuation of the property of the railway companies.

On the valuation matter the chamber said:

> Respecting the basis for the valuation of any physical property of the companies which is to be considered in any plan for a unified system it is our belief that the property thus acquired should be confined to that useful and needed for the operation of the lines in such a system and should not embrace any property of lines whose utility has been superseded; it is assumed that the appraisal will be based on the condition of the property as of the date it is acquired, and its first cost and not upon inflated values.

The Chamber of Commerce then asked the Governor to clear up these points as they could not be explained in the traction bill. In reply the Governor wrote to Mr. Cranford on March 30 in part as follows:

> All the bill does, which is said to be so radical, is to prevent obstruction to the efficient exercise of those powers.
>
> I can assure you that nothing but fitness will be considered in the selection of the commission.
>
> I trust that only such properties will be included in any plan of reorganization as are and will continue to be needed in the public service, and that all properties will be valued at their real worth for such service. No rule could safely be prescribed by statute. The cost of production rule would undoubtedly be unjust to the public at the present time.
>
> The statute excludes franchise and going values. There is no injustice in that, because bankrupt properties can hardly possess such values. The question is what are these properties fairly worth in their present condition for the purpose of reorganization and rehabilitation. It will not require as much time to decide that question as it would to go into the last detail of values, which is ordinarily done in rate cases. As you say the question is one to be decided upon business principles by men of judgment.
>
> The consideration to security holders for the concessions required of them will be a security with an assured fair return in place of one with uncertain or no return. Necessarily, therefore, the rate of fare will be an important element of any settlement and cannot be determined in advance thereof, certainly not in advance of the deposit by the companies of the necessary consents to clothe the commission with ample power to put into effect whatever plan may be determined upon.
>
> The task before the commission is not an easy one. I feel confident that it can be done if approached with resolution, courage and the determination to do exact justice. There must be no such haggling over terms as has attended prior negotiations. The commission must first decide what is just and fair and then insist upon that, no more no less.

Jitneys Collect $350,000 a Year in Seattle

According to a report to Mayor Hugh M. Caldwell by David W. Henderson, superintendent of the Seattle Municipal Street Railway, jitney buses have flourished in Seattle since fares on the railway went up to 8⅓ cents. A one-day check indicates the jitneys are taking nearly $350,000 a year in revenues from the municipal railway. The report is based on a check made by the railway department Jan. 26, compared with a similar check made Oct. 14 last year.

The summary, covering all the jitney routes except the Rainier Valley line, which was omitted because the city does not operate that traction line, shows 1,659 trips were made by buses Jan. 26, as against 1,482 Oct. 14; that 9,522 passengers were hauled Jan. 26, as against 7,877 Oct. 14. This represents an increase of 177 in number of trips, or 11.9 per cent, and an increase of 1,645 in the number of passengers, or 20.9 per cent. At 10 cents each the Jan. 26 receipts of the jitney operators were $952.20, or approximately $347,553 a year.

	Commonwealth Power, Railway & Light Co. System			Bangor Railway & Electric Company			Nashville Railway & Light Company		
	1920	1919	Increase or Decrease, per Cent	1920	1919	Increase or Decrease, per Cent	1920	1919	Increase or Decrease, per Cent
Gross earnings	$31,285,981	$25,964,899	20.5	$1,262,779	$1,094,675	15.4	$3,675,209	$3,224,384	14.0
Operating expenses and taxes	22,390,298	17,029,303	31.5	800,777	656,598	22.0	2,979,332	2,436,296	22.3
Net earnings	$8,895,683	$8,935,596	— 0.4	$462,002	$438,077	5.5	$695,877	$788,088	—11.7
Interest, etc	7,020,765	6,516,468	7.7	263,707	253,111	4.2	479,326	475,146	0.9
Balance	$1,874,918	$2,419,128	22.5	$198,295	$184,966	7.2	$216,551	$312,942	—30.8
Pfd. stock div.	1,077,180	1,077,180	....	105,000	105,000	....	125,000	125,000	....
Balance	$797,738	$1,341,948	—40.6	$93,295	$79,966	16.7	$91,551	$187,942	—51.3

	East St. Louis & Suburban Company System *			Portland (Ore.) Railway, Light & Power Company			Cumberland County (Me.) Power & Light Company		
	1920	1919	Increase or Decrease, per Cent	1920	1919	Increase or Decrease, per Cent	1920	1919	Increase or Decrease, per Cent
Gross earnings	$4,368,922	$3,213,152	36.0	$9,564,615	$8,591,001	11.3	$3,114,008	$2,768,600	12.5
Operating expenses and taxes	3,318,196	2,539,504	30.7	6,509,505	5,491,493	18.5	2,142,834	1,813,934	18.1
Net earnings	$1,050,726	$673,648	56.0	$3,055,110	$3,099,508	— 1.4	$971,174	$954,666	1.7
Interest, etc	651,775	667,523	— 2.4	2,268,267	2,269,972	— 0.1	667,483	672,252	— 0.7
Balance	$398,951	$6,125	....	$786,843	$829,536	— 5.1	$303,691	$282,414	7.5

* Not including Alton Granite & St. Louis Traction Company and Alton Gas & Electric Company.

Ohio Interurban Road Suspends

Inability to make enough money to pay its power bills has caused the Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, to discontinue service. The road stopped operating at midnight on March 25. The line owed the Cleveland & Southwestern Railway $9,000 for power furnished during the past six months. State Representative C. G. Taylor has been receiver for the Sandusky, Norwalk & Mansfield line ever since 1913.

Cessation of service on the line has left a score of small communities without any traction service and hundreds of people have to go 5 and 6 miles to reach a steam railroad. The road also carried many school children each day. Scores of customers, including a co-operative farmers elevator and a foundry at North Fairfield have been left without electrical energy by the cutting off of power. The farmers hope, however, that a new syndicate will be formed to resume service on the line.

High wages to trainmen did not cause the road's financial difficulties as the conductors and motormen have been receiving only 35 cents an hour, compared with 66 cents an hour paid by electric interurbans in adjoining territory.

Receiver Taylor made every effort to operate successfully but without result. He said that when the line was built it was financed by the issuance of $800,000 of bonds, with $800,000 of the stock given as a bonus. He adds that so far as he has been able to ascertain less than $400,000 in cash found its way into the property. The line operated 33 miles of track.

2,000,000 Passengers a Year on Municipal Line at Present Rate

The Street Railway Commission of Detroit, Mich., has announced revenues of approximately $9,939 on the operating municipal ownership lines in Detroit for the month of March when 198,789 passengers were carried. This compares with $7,832 for February. The March passenger rate is in excess of 2,000,000 passengers per year. Figured on a daily basis, the average daily revenue during the last half of March showed an increase of 14 per cent over February traffic.

The Board of Assessors has been asked by the Street Railway Commission to place the municipal lines on the tax rolls this year, and it is the contention of the commission to tax the municipal ownership lines by the same method of valuation used in the case of the Detroit United Railway.

The figures relative to the Detroit United Railway earnings since last December have not been given out by the company. Following the annual meeting of the company in February, it was announced that the figures would be made public about April 10, which would be after the election at which the service-at-cost ordinance was to voted upon.

According to a statement by Corporation Counsel Wilcox the audit of the company's account up to December, by special city accountants, shows that the amount of income used to meet the increase in pay of the platform men for which the charging of additional fare was permitted, had dropped from $156,000 to $120,000 from July to December. This is held by city officials to indicate the extent of the cut in service made by the company.

Financial News Notes

Receiver Makes Interest Payments.—By authority of the federal court E. Stenger, receiver for the Denver (Col.) Tramway, has paid interest obligations and sinking fund requirements amounting to $196,650 which became due on March 1 and April 1, 1921, on four of the company's bond issues.

Court Sanctions Interest Payment.—Fearing that the taking over of city street railway lines at Lima would interfere with the operation of the Ohio Electric system, Receiver B. F. Jones secured an order from federal court at Toledo granting permission to pay $8,750 interest due April 1 on $350,000 of second mortgage bonds held in trust by the Fidelity & Trust Company, Buffalo, N. Y.

Toledo Deficit Exceeds $100,000.—The deficit in operating expenses and consequent drain on the stabilizing fund at Toledo, Ohio, have reached above the $100,000 mark now. The next report of the Community Traction Company will be issued on April 11. Many improvements suggested by Commissioner McCann and increased industrial activity in the city are counted on to change this condition.

Additional Rapid Transit Bonds Authorized.—The Board of Rapid Transit Commissioners of Cincinnati, Ohio, has approved a bond issue of $1,500,000 at 5 per cent interest, maturing in fifty years, with a twenty-five-year optional redemption. The issuance of these bonds will bring the total of bond issues for the rapid transit work up to $4,000,000, of which $2,500,000 already has been issued.

Bonds Extended at Increased Interest.—The $500,000 of Portland Lighting & Power Company, Portland, Me., first mortgage 4½ per cent bonds due April 1, 1921, have been extended to April 1, 1931, at 7 per cent. The Cumberland County Power & Light Company now owns the Portland Lighting & Power Company. Sufficient of the Cumberland County first and refunding 5 per cent bonds due 1945 are set aside and held for the retirement of these bonds, but under present financial conditions it is quite impossible to sell long-term 5 per cent bonds except at considerable sacrifice. Consequently the Cumberland company decided to extend the time of payment. A cash bonus of $15 on each $1,000 in bonds will be paid to each holder agreeing to the extension.

Hull Loses Trolley Service.—The last car of the Eastern Massachusetts Street Railway to operate in the little town of Hull made its final trip on April 4. The trustees operating the company had notified the town officials that failure to appropriate the necessary $4,000 to meet the operating deficit would result in suspension of railway service. The town fathers evidently had made other arrangements which seemed to them preferable, for they withheld the desired appropriation, and the day following the cessation of railway service, a line of auto buses commenced to operate over the former railway route.

Certificate of Stock Increase Filed.—The Interstate Public Service Company, which recently took over the utilities corporations in New Albany and Jeffersonville, Ind., including the electric lines to Louisville, has filed in the office of the Secretary of State, Indianapolis, a notice of the increase in the capital stock of the company from $8,000,000 to $15,000,000. Of the stock $10,000,000 is common and $5,000,000 preferred. Companies which have been taken over by the interstate company are the Louisville & Southern Indiana Traction Company, the Louisville & Northern Railway & Light Company, the United Gas & Electric Company of New Albany and Jeffersonville, and the New Albany Water Company. The filing of the certificate is a formality in connection with the deal referred to at length previously in the ELECTRIC RAILWAY JOURNAL.

Cities Service to Double Common Stock.—At the annual meeting of Cities Service Company, New York, N. Y., on April 26, stockholders will be asked to approve an increase in the authorized amount of the common stock of the company from $50,000,000 to $100,000,000, the purpose of the increase being to provide additional common stock for regular stock dividends on the common stock, conversion of outstanding debentures and for other future corporate requirements. Cities Service Company has outstanding $29,192,592 principal amount of convertible debentures, these debentures being convertible partly into Cities Service Company preferred stock and partly into Cities Service Company common stock. In addition, Cities Service Company is now paying stock dividends at the rate of 15 per cent a year in common stock at par on the common stock. Of the present authorized $50,000,000 common stock of the company, $47,985,798 had been issued up to March 10, 1921. In addition to other routine business, stockholders will be asked to authorize, or approve, the action of the directors in making a new contract with Henry L. Doherty & Company as fiscal and operating agents of Cities Service Company, the present contract expiring on May 1, 1921. The annual report of the company for 1920 will be ready April 15.

Traffic and Transportation

Jitneys Off Railway Streets

Kansas City, Mo., Finally Gets Around to a Measure of Reasonable Regulation

A forward step toward such adjustment and regulation of transportation facilities as will best serve the entire community has been taken by Kansas City, Mo., in the passage of an ordinance confining jitneys to streets upon which there are no regularly operated electric railway lines.

The ordinance uses the term "street cars." Following is the paragraph containing the prohibition:

> Section 1. No person, firm or corporation shall drive, run or operate any "jitney" upon or along any street, avenue or roadway within the limits of Kansas City, Mo., upon which there is located a street car track or tracks upon and over which street cars are regularly operated; provided, nothing herein contained shall be construed as prohibiting any "jitney" from crossing any such street, avenue or roadway.

Under other ordinances jitneys must operate only over routes prescribed by a "jitney inspector," a city official. New routes, away from street car lines, are therefore being designated by the inspector and assigned to the various jitney operators; routes of existing jitney lines are readjusted where possible.

The jitney men's association has announced that it will oppose the ordinance by legal steps. Injunction proceedings were brought before a court of the county at Independence, Mo., on March 26 to restrain city officials from enforcing the prohibitory ordinance. The temporary restraining order was issued, returnable on April 2.

Although jitneys have been kept off some of the streets in the down town congested district they have not been regulated in outlying districts. The result is that jitneys have customarily paralleled street car lines and sniped passengers. At first the jitney service was run catch-as-catch-can, but the operators have now been organized for several years and they are preparing to present a united front against the new ordinance and against other regulatory measures.

The jitney association has regulations for the control of its members, enforced by fines and other penalties. These regulations are such as might be imposed by ordinance, though some of them are apparently outside the province of city control. A court is maintained of members before whom offending operators are brought for trial. A jitney patron, another jitney operator, or any person may bring charges against an operator. If the charges are sustained the operator is fined; or, in serious cases, his membership is canceled. Discourteous treatment of patrons, careless driving, violation of traffic rules and similar matters are covered in these hearings.

The possession of a regular revenue enables the association to pursue certain lines of investigation toward improvement of operating factors. One inquiry conducted has resulted in the design of a standard coach body and chassis with a capacity of 15 passengers on 1½-ton chassis. Several coaches made to these specifications have been built to the order of the operators. The ultimate result of standardization efforts was expressed by a jitney association official as follows:

> The operators who can afford the new coaches will buy them; the association will see to it that the owners of these coaches have the favored opportunity on routes. They will get more business because they can give better service. Earning more they will attract the attention of investors, through whom as well as through purchases by other jitney operators the number of standard coaches in service will steadily increase. The next development will be the combining of interests by a few jitney operators; and then will come the consolidation of all the interests under one corporation.

Much publicity is being given to the difficulty encountered by the jitney inspector in selecting routes that will not be objected to by property owners. This situation is being used to advantage to indicate the bitterness of the "fight against jitneys" and the predicament into which the new ordinance has plunged the association.

In a further development of the "location" program there is a reported plan of the jitney inspector to route some jitneys through "Petticoat Lane," or Eleventh Street, the chief shopping thoroughfare in the midst of the retail district—the only downtown east-west street without car tracks. There is only one street north and south in the congested business district without car tracks, Baltimore Avenue, and this street is now a jitney route. Opposition to making of Petticoat Lane a jitney thoroughfare is expected from merchants and public. This hostility is expected to demonstrate further any weaknesses of the new ordinance.

Ten-Cent Fare Suspended

Pending inquiry into the reasonableness of the proposed 10-cent fare on the Princeton line of the New Jersey & Pennsylvania Traction Company the Board of Public Utility Commissioners has issued an order suspending the increase until July 12. The company in submitting the petition for the increase intended that the 10-cent fare should go into effect April 12. The first hearing on the company's application will be held at the State House on April 19. The commission recently replaced a short time ago refused the company permission to increase the fare 1 cent in each zone.

Increased Fare Continued

City of Columbus Insists, However, that $750,000 a Year Be Spent for Improvements

The Columbus Railway, Power & Light Company, Columbus, Ohio, has not as yet taken action looking to the acceptance of the extension of the present rate of fare voted by Council a few weeks ago. Council passed an ordinance authorizing extension of the present rate over the period of the blanket franchise, expiring April 3, 1926, thus amending the section under which the company was authorized to charge a fare of 6 cents cash, or 5 tickets for a quarter, for the period ending in April, 1922, after which the rate was to be reduced to 5 cents cash, or six tickets for a quarter.

6-CENT FARE NECESSARY TO RESTORE CREDIT

The 6-cent fare was extended in response to the company's showing that under the old rate of eight tickets for a quarter it could not restore its credit, make any of the improvements demanded by the Council, or even continue the existing schedule of service. The restoration of normal conditions in the affairs of the company was shown to be impossible if the fare were to be reduced in 1922, for eastern bond houses had agreed to finance required improvements and extensions only if the Council agreed to extend the period of the increased fare.

In return for the authority to continue the present fare during the life of the blanket franchise, the Council asks the company to guarantee that it will expend not less than $750,000 a year for service improvements, extensions, betterments and additional trackage. It is this guarantee which has not yet received the sanction of the company's directors.

PAVING PROGRAM HELD UP

Charles L. Kurtz, president of the company, has been in Mexico for a number of weeks and has just returned. He declared, since his return, that the board of directors are to hold a meeting within a few days to consider the ordinance, and to arrange to meet the conditions of the extension of fare if it could be done.

Much of the work required of the company consists of new paving of Columbus streets and laying of new lines. Paving programs contemplated by the city are being held up pending the company's report of its ability to finance the improvements demanded of it, and to effect such financing its officials must show the security companies that the company's revenues will be adequate to secure any indebtedness which it may incur.

By the terms of the ordinance passed recently the Council will determine whether the company lives up to any agreement which may be reached as to the amount to be expended during the remaining years of the franchise.

Anomaly in Cleveland Suburban Fare Case

Less than 10 per cent of the car riders of Lakewood, Ohio, are now paying a 6-cent fare for their rides to and from Cleveland, although that is the rate the Cleveland riders all must pay, in addition to a cent for a transfer.

At the request of city officials of Lakewood the Common Pleas Court of Cuyahoga County has issued an injunction restraining the Cleveland Railway from demanding a 6-cent fare in Lakewood because the city of Lakewood has a franchise calling for a 5-cent fare.

Up to the time the Lakewood officials obtained the injunction more than 90 per cent of the Lakewood car riders were voluntarily paying the 6-cent fare. The date for a hearing on a permanent injunction has not as yet been fixed by the court.

Car riders who board cars inside the city limits of Cleveland and ask for Lakewood transfers must pay a 6-cent fare, plus 1 cent for a transfer. The court made this amendment to its ruling because some local Cleveland riders were taking advantage of the situation and riding for 5 cents by merely asking for a Lakewood transfer. Lakewood riders, on payment of the 5-cent fare, may transfer to the Cleveland lines without paying a cent for a transfer.

The City Council of Cleveland is threatening to require the railway to cut service to Lakewood, but the Cleveland Railway insists that it will have to obey the court's order and its franchise terms, allowing Lakewoodites to ride for less than Cleveland car riders pay, despite a much longer haul.

Subway Suggested for Seattle

As a result of a study of the transportation problem confronting the city of Seattle, Wash., and of the suggestion of a possible solution of the matter through the construction of a system of elevated railroads and subways, City Engineer A. H. Dimock has submitted to the Mayor and City Council a report covering the subject. The report is signed by Engineer Dimock, Major Carl H. Reeves, Superintendent of Public Utilities, and D. W. Henderson, Superintendent of Railways. The proposed rapid transit plans are not submitted for immediate action, but merely to start discussion and planning on the subject. The project is one of "purely academic interest" at this time, according to Mayor Hugh M. Caldwell.

The plan, in brief, provides for the concentration of traffic from several surface routes in the Third Avenue subway, and to provide stations where passengers may be transferred from surface cars to the trains. Six stations are proposed at advantageous locations. Trains would be operated from these stations on surface routes set apart for their special use. The possible use of motor buses is considered in the plans.

The report states that a possible saving of $1,200,000 over the present plan of operating entirely on the surface may be effected by the proposed system.

Short Skirts Do More than Attract Attention

While the reformers may go about pranting and objecting to the short skirts, the Jacksonville (Fla.) Traction Company has found that the new style dresses have their place in finance. Anyway, the railway at Jacksonville is strong for the "knee-high models." They prevent accidents. There's your reason.

J. S. Harrison, claim agent for the company, announces that the accident figures for 1914 showed 180 accidents in which women figured while boarding or alighting from cars. With the gradual raising of the fair one's skirts has come the same gradual lowering of the number of women-accidents, through the succeeding years until 1920 when, Mr. Harrison reports, there were only seventy-three accidents in which women were involved.

The heel of the shoe catching in the skirts used to be the principal cause of accidents to women, according to Mr. Harrison's figures, but with short skirts at the "height of fashion" there "ain't no such" accidents—except once in awhile where the fair one has turned her back on Dame Fashion. No longer do the ladies have to watch their step. It is the men that may now be found doing that—watching the ladies step.

Expect Increased Rates to Be Sustained

The private bills committee of the Ontario Legislature has approved a bill prepared by the Public Utilities Commission of the city of Port Arthur, allowing the commission to collect a fare commensurate with the cost of service provided the matter is subject to a vote of the ratepayers of the city of Port Arthur and approved by the Ontario Railway & Municipal Board.

The first step in this matter dates back to September, 1920, when the fares were increased to 7 cents cash or four tickets for 25 cents, notwithstanding the statutory limit specified was a 5-cent fare. Soon after placing the new rate into effect the Ontario Railway & Municipal Board declared the rate was illegal and ordered the commission to revert to the old fare.

An appeal was taken to the courts and while the matter was pending the commission prepared the bill mentioned previously. Under this appeal the Public Utilities Commission is continuing to charge the increased fare. It is expected that the Provincial Legislature will pass the bill and that it will become a law with the assent of the Lieutenant Governor in Council some time during June of this year. This will enable the commission to decide upon a rate of fare commensurate with the cost of operation and submit same to a vote of the ratepayers.

Unfair Bus Competition Prevented in Toledo

The City Council at Toledo, Ohio, has passed the bus regulatory measure, but the indemnity bond amounts and license fees were trimmed down by an amendment to the original bill.

The ordinance now requires that buses carrying up to ten passengers must post a $5,000 indemnity bond; those with a capacity of ten to twenty passengers a bond of $7,500; and those above twenty-passenger capacity a bond of $10,000. The license fees for these three classes of buses are $50, $75, and $100, respectively. The drivers license is $1. Originally the ordinance carried amounts from two to three times greater than these. Street Railway Commissioner Wilfred E. Cann and other railway officials believe that the regulation will help to remove some of the ruthless competition of the buses with the railway. The buses have been taking away more than $700 a day from the railway where pavements are good and hauls conducive to short trips.

Improved Traffic Control Proposed for Chicago

Inspired by traffic control methods which they investigated in several Western cities on a recent tour members of the local transportation committee of the Chicago City Council on March 31 voted to recommend their adoption locally.

Experiments will be made at six intersections in the down-town district with a semaphore system similar to that used in Los Angeles. A survey of down-town streets will be made with a view to designating their use for heavy vehicles or automobiles, and also for the possibility of eliminating left-hand turns. It is likely also that certain portions of the space under Michigan Boulevard where it is elevated will be set aside for parking of automobiles, to keep them off the crowded streets.

The local transportation committee also studied results under municipal operation of the electric railway lines in Seattle and San Francisco. It will report on this in the near future.

Jersey Jitney Bill Repassed

Governor Edwards of New Jersey on April 4 vetoed the Elliott bill, placing jitney buses under control of the State Public Utility Commission. He said:

> I am opposed to the measure for the reason that I think the matter of regulation of a local conveyance such as jitneys should be left with the local authority which, in my judgment, is better informed and better equipped to handle the problem. To delegate this work to the utility commissioners would be to increase the work of an already over-burdened board.

The measure placed under the jurisdiction of the utility board all auto buses or jitneys, the routes of which parallel upon the same street the line of any street railway or any other utilities, thus giving to the commission control of all jitneys in the state.

The bill has since been repassed by both houses over the Governor's veto.

So the Public May Know

Cards bearing the names of conductors are being displayed prominently in all the cars of the Monongahela Valley Traction Company, Fairmont, W. Va. An officer of the company explains:

> Courteous treatment always causes a desire on the part of the traveling public to know the names of the crew. There are many occasions when patrons come to us with praise for a conductor, but they do not know his name and do not remember his number. Because of this failure we are unable to let the conductor know that he is being appreciated. On the other hand, the company sometimes has in its employ conductors who are not courteous or who do not give good service. The cards will provide patrons names of these men so they can be reported.

Transportation News Notes

Increases Asked in New Castle.—The Sharon & New Castle Street Railway, New Castle, Pa., has filed a new tariff of rates with the Public Service Commission naming one way and commutation fares between Hubbard, New Bedford and New Castle.

Wheeling Work Divided Up.—Starting with the last week of February every crew working for the Wheeling (W. Va.) Traction Company, with the exception of the men on the Wheeling and Steubenville division, is being worked on six days a week. The company in this way is able to keep its extra crews employed by dividing up the work.

More Trailers for London.—Sanction has been given by the Ministry of Transport to the use of trailer cars on twenty-two additional routes of the London County Council Tramways. This is a material concession, as hitherto trailers have been allowed on only a very few routes. The capacity for coping with the morning and evening rushes of traffic will be very much enhanced.

Police and Firemen Ride Free.—Mandate has recently been served on the Seattle & Rainier Valley Railway to let policemen and firemen ride free, and to refund all fares collected from them. Service was made by Sheriff Matt Starwich, for Thomas J. L. Kennedy, assistant corporation counsel. The action was taken when the Supreme Court denied the company's motion for a rehearing in the case, which the Supreme Court decided in favor of the city.

Five-Cent Fare Continued.—The City Council of Akron, Ohio, under suspension of rules, on March 29 passed an emergency ordinance renewing the 5-cent cash fare ordinance for the Northern Ohio Traction & Light Company, which expired April 1. The 5-cent fare will be continued on city lines until July 1. The negotiations between the company and the city looking toward relief for the railway through an increase in fare have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Skip Stops Go at Des Moines.—Des Moines has abandoned the skip stop after three years. Without previous announcement the Des Moines City Railway, through F. C. Chambers and Homer A. Miller, decided to restore the old system the day the change was advertised. There has been almost constant complaint against the practice ever since it was adopted and with the competition being furnished by the buses, which stop upon signal from a passenger, regardless of his location, the receivers for the railway thought it best to do away with the plan.

Southern Company Seeks Increased Rates.—The Columbia Railway, Gas & Electric Company, Columbia, S. C., has applied to the State Railroad Commission for permission to increase fares between Columbia and Camp Jackson. The company is asking for a rate of 2 cents a mile which would mean a 14-cent fare instead of the present 10-cent rate. In its petition the company claims that the returns do not meet the operating costs. The railway is also planning to discontinue the privilege of free transfers. In the city of Columbia the present fare is 7 cents.

Commission Inspector Reports on Crowding.—H. C. Eddy, with a corps of inspectors from the Board of Utility Commissioners of New Jersey, recently investigated the service of the Trenton & Mercer County Traction Corporation and in a special report announced that the one-man cars were overcrowded, and that cars with a capacity of fifty passengers frequently carried as many as seventy-seven people. The inspectors state that the overcrowding of the cars disarranges schedules and decreases safety. It is suggested that the inspectors of the railway should be so distributed as better to handle the crowds. Lack of co-operation on the part of a number of platform men is considered another obstacle. A recommendation has been made that patrons of the railway be required to have the exact fare ready when they board the cars or be made to pay 10 cents for a ride.

Six-Cent Fare Continued.—The Public Service Commission of Indiana has issued an order allowing the Public Utilities Company, operating the city lines at Evansville, to continue the 6-cent fare. In doing this, the commission said that an examination of the company's operating statement for the last three months of 1920 indicates the present fares "have not been sufficient to yield a reasonable return on the value of the property over and above the necessary operating expenses." The 6-cent fare went into effect in Evansville when prices were at the peak as a temporary measure and has been extended from time to time by the commission. When the hearing was held which resulted in the granting of a 6-cent fare, the company contended that it was realizing only a negligible return on its investment over and above operating expenses. The city attorney of Evansville contended that the company placed the value of its property too high. The company introduced as evidence the valuation by a private engineering firm, hired by the company. While the fare remains at 6 cents, patrons can buy twenty checks for $1.

Commission's Rate Power Contested.—The question of the right of the Interstate Commerce Commission to direct the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., to charge 3.6 cents a mile on its electric line between Schenectady and Gloversville was raised on a hearing before Public Service Commissioner Frank Irvine of the Second District recently. The commission had previously issued an order requiring the company to show cause why it is charging 3.6 cents. The company filed its answer at the hearing. It alleged that it is a corporation acting as an interstate and intrastate carrier over which the Interstate Commerce Commission has exercised control and that it is subject to Federal legislation regulating interstate traffic. The company is charging the 3.6-cent rate, it says, because it understands that it is compelled to do so by virtue of the mandatory provisions of the Interstate Commerce Commission's order directing the recent 3.6-cent rate generally for intrastate travel. The company says it is willing to conform to the law and desires a final determination and it suggested that for its protection, the Interstate Commerce Commission be made a party to the show-cause order.

Minneapolis Service Improved Greatly.—Report by the city inspector is to the effect that service by the Minneapolis (Minn.) Street Railway has practically reached the 1917 standard, the maximum of the company's history. In December 403,329 passengers were carried and in January, 1921, 401,772. Despite the decline in passengers the improvement in service continued. Inspector Eugene S. Lund's report reads: The average number of revenue passengers carried on weekdays in July, 1920, was 370,382, as compared with 401,772 in January, 1921, the report shows. The car miles operated in July were 42,986, as compared with 52,621 in January. The average revenue passengers carried per car mile in July was 8.61, while in January it was reduced to 7.64. The number of cars operated in the late rush period in July was 416, as compared with 558 in January. The trips in the rush hours in July were 749 and in January 1,075. President Horace Lowry said: "Passengers are primarily interested in two factors. They expect a seat in the non-rush period and loading that is not excessive in the rush hours. Today we are giving that service. The difference today, compared with the service of 1917, is that we are giving service in the rush hours equal to that of 1917, while in the non-rush hour periods we are using no excessive equipment, but are giving passengers seats."

Legal Notes

INDIANA — *Automobile Occupant with Knowledge of Intoxicated Condition of Driver Held Contributorily Negligent.*

Where the driver and occupants of an automobile colliding with a train had been drinking intoxicating liquors, a member of the party, who knew of the intoxicated condition of the driver in time before the crossing was reached to have left the automobile and avoided injury, was guilty of contributory negligence. [Kirmse vs. Chicago T. H. & S. E. Railway, 127 Northeastern Rep., 837.]

INDIANA—*Motorist Crossing Tracks Without Looking Held Guilty of Contributory Negligence.*

Where a motorist, knowing that street cars were liable to pass at any time, did not look for cars after he passed a building flush with the corner, and had an opportunity to see down the tracks, he must be deemed guilty of contributory negligence, provided he could have seen the approaching car in time to have stopped his vehicle or avoid the accident. [Union Traction Company of Indiana vs. Moneyhun Company, 127 Northeastern Rep., 443.]

MISSOURI—*Error to Exclude Testimony of Claim Agent that None of Defendant's Employees Knew of an Alleged Assault.*

In an action against a street railway company for an alleged assault by a conductor, the court erred in not permitting the defendant to prove by its claim agent, who investigated the case, that the crews on all cars operated on the line where the assault was alleged to have taken place were examined by the witness, and that none of them knew anything of the alleged occurrence. [Brown vs. United Railways of St. Louis, 222 Southwestern Rep., 890.]

NEBRASKA—*Conductor Need Not Warn Passenger that Car Has Not Stopped, or of Danger in Attempting to Alight.*

Where a street car is reducing speed for the purpose of stopping and discharging a passenger, in response to a signal, it is not the duty of the conductor to warn the passenger, who has proceeded to the rear platform with the apparent purpose of being in readiness to alight, that the car has not stopped, or of danger in attempting to alight, unless there is something in the appearance or conduct of the passenger which should reasonably give the conductor notice that the passenger is to some degree helpless or intends from carelessness to alight while the car is still moving. [McCoy vs. Omaha & C. B. Street Railway, 117 Northwestern Rep., 791.]

NEW YORK—*Negligence of Borrower of Automobile Not Imputable to Owner When Car Was Damaged Through Negligence of Railway Company.*

Where an automobile was lent for use and was damaged through negligence of both the borrower and the company, the owner of the car, on the principle of liability of joint tort-feasors, can nevertheless recover for damage from the street railway company, the negligence of the borrower not being imputed to the owner. [Fischer vs. International Railway, 182 New York, Supp., 313.]

NEW YORK — *Removal of Subway Kiosks at Company's Expense Not Compelled.*

The location by a traction company of subway kiosks on the sidewalks of the street under a certificate issued by the Board of Rapid Transit Railroad Commissioners effected a contract between the city and the company, the consent of local authorities having control of streets being obtained, so that when the street was later widened the city could not compel the company to bear the cost of removing the kiosks from the roadway. [City of New York vs. Hudson & Manhattan Railroad, 128 Northeastern Rep., 152.]

NEW YORK—*New York City Not Authorized to Operate Bus or Stage Lines.*

There is no statutory authority for the operation of bus or stage lines by the city of New York on its streets, and such action is forbidden by the charter, except by grant or franchise. Even if the street car service is in a permanent condition of inadequacy the city cannot undertake such a service under the plea of an "emergency," which is a sudden or unexpected occurrence or condition calling for immediate action. A railway company may enjoin such operation. [Brooklyn City R.R. vs. Whalen, 182 New York Supp., 283.]

NEW YORK—*Public Service Commission Held to Have Jurisdiction to Fix Rates Within City Limits of Railroad.*

Under the Public Service Commissions Law the commission has jurisdiction to authorize a railroad organized under the General Railroad Law of 1850 and using private right-of-way acquired under the present Railroad Law across streets in the city of New York to charge a higher rate of fare within the city limits than that prescribed by an ordinance giving the city's consent to the use of streets, since the fixing of such rates was within police power of the state, and since it had fixed the rate to be charged, the city was precluded from making the charging of a specified rate a condition to its consent to use of streets by the railroad. [People ex rel. N. Y., W. & B. Railway vs. Public Service Commission, First District of New York, et al., 183 New York, Supp., 473.]

NEW YORK—*Passenger Has Burden of Proving Carrier's Negligence When Adjustable Seat Collapsed.*

Despite the doctrine of *res ipsa loquitur*, which may be relied on as raising presumption of negligence, a passenger on a car injured when an adjustable seat collapsed has the burden of establishing negligence, for otherwise the carrier would be an insurer. [Slomka vs. Nassau Electric Railway, 182 New York Supp., 156.]

PENNSYLVANIA—*Husband Not Agent of Wife in Procuring Her Signature to Release.*

That a wife stood silent while her husband bargained with the company's claim agent will not constitute her husband her agent and render her bound by his acts in procuring a settlement and in obtaining her signature to a release, the wife maintaining that the release was obtained by fraud. [Ralston vs. Philadelphia Rapid Transit Company 110 Atlantic Rep., 335.]

SOUTH CAROLINA—*Franchise Held to Obligate Grantee to Build Extensions.*

A street railroad franchise which stated that, in consideration of the construction and operation of the railway within the city and its extension and operation to designated points outside the city, the city remitted all license taxes, provided that until the extensions were made the taxes should not exceed a stated sum, was a contract binding the company to construct the extensions, not merely permitting it to do so. [Thomas vs. Spartansburg Railway, Gas & Electric Company, 103 Southeastern Rep., 149.]

WISCONSIN—*Reasonableness of Rates Depends on Effect on System as a Whole.*

Where a street railway and a suburban railway were operated as one system, the reasonableness of rates fixed by the Railroad Commission as to the operation of the suburban line is not affected by the fact that such line will be operated at a loss under the rates so fixed, the test of reasonableness being the effect upon the system as a whole. [Milwaukee Electric Railway & Light Company vs. Railroad Commission of Wisconsin, 177 Northwestern Rep., 25.]

WISCONSIN—*Stopping of Street Car Not Invitation to Traveler to Cross Street.*

The stopping of a street car at a customary place for discharging and taking on passengers is not an invitation to a traveler in an automobile to cross ahead of it, and if he is so situated that the car can safely start and safely continue, provided he yields the right of way and can safely do so, the car can proceed upon its trip. [Dering vs. Milwaukee Electric Railway & Light Company, 176 Northwestern Rep., 343.]

Personal Mention

C. P. Taft to Resign from Ohio Traction Company

Charles P. Taft, publisher of the Cincinnati (Ohio) *Times Star* and brother of the former president of the United States, William Howard Taft, has submitted to President W. Kelsey Schoepf his resignation as first vice-president and director of the Ohio Traction Company, Cincinnati, Ohio, and as a member of its executive committee. In his letter of resignation Mr. Taft assigns no reason for his action. The resignation will be presented to the board of directors for their consideration at their next meeting.

Mr. Taft recently was instrumental in forming a stockholders' committee of the Cincinnati Street Railway to look after the interests of that company in the developments in the railway situation in Cincinnati. This committee was formed at the time the Cincinnati Traction Company and the Cincinnati Street Railway named special committees of their boards to enter upon negotiations for a revision of the terms of the lease, the franchise and the capitalization of the companies.

It is understood that Mr. Taft will continue to serve as a member of the directorate of the Cincinnati Street Railway. The significance of Mr. Taft's action is that, although he is largely interested in both companies, he will devote his attention and influence to the interests of Cincinnati Street Railway in the pending negotiations.

Airplane Used to Inspect Power Lines

P. H. Chase, chief electrical engineer for the American Railways, and W. R. Power, general manager of the Ohio Valley Electric Railway and the Consolidated Light, Heat & Power Company, have demonstrated that it is possible to inspect high-tension lines by airplane. The test was made in a new Curtis "Oriole," with Bob Shank, a local aviator at Huntington, W. Va., as pilot. The flight was started from Kyle field, the home grounds of the aërial taxi, and continued to Hurricane, in Putnam County, a distance of 25 miles and return.

The line inspected is being constructed by the Virginia Power Company from Cabin Creek, in Kanawha County, to Huntington. The pole lines are now completed to the southeasterly limits of the city and the wire itself has been brought down the valley to a point near Milton.

Mr. Chase and Mr. Power said that they found it entirely possible to make the inspection from the airplane. They said that in the event of trouble a flying inspector could see from the air whether a mishap was due to slide or a break in the wire. This method of getting a bird's-eye view of the line will make it possible to save much time in the location of trouble and thus help to render better service.

J. R. Ong Goes South

Former Transportation Engineer in Winnipeg Takes Similar Position with Georgia Railway

J. R. Ong has accepted a position with the Georgia Railway & Power Company, Atlanta, Ga., as transportation engineer. This opening was created last month by the organization of a new department within the transportation department for the purpose of increasing the efficiency of the transportation service. Mr. Ong reports to the manager of the railway department and works directly with the transportation department in building and fitting schedules for the operation of cars to meet service requirements.

J. R. ONG

The new transportation engineer will carry on a continuous traffic survey over all lines so that the car service furnished to the public can be fitted to the needs of those who use the service. Having arrived at definite information relative to the exact number of passengers to be expected on given lines at given times, Mr. Ong will be in a position to make up schedules which will be for the best interest of the public and company. This will relieve the transportation department of similar work and will leave the transportation department free for the operation of cars to meet the new schedules as outlined.

Mr. Ong was graduated from Purdue University in 1909. His practical railway experience began in the car shops and power plants during the construction and early operating period of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., and the Chicago, Lake Shore & South Bend Railroad, Michigan City, Ind. After he was graduated from Purdue he became an apprentice in the East Pittsburgh works of the Westinghouse Company and was later transferred to the Philadelphia sales office of that company. In 1911 he became superintendent of substations on the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.

In December, 1911, Mr. Ong accepted the appointment as electric railway engineer on the joint engineering staff serving the Railroad Commission of Wisconsin and the Wisconsin Tax Commission. In this position he specialized on transportation matters and made extended studies for the Railroad Commission relating to operating matters and service on the electric railways of Wisconsin. After serving with the Wisconsin Commission for some time he resigned to accept the position of traffic engineer for the Board of Control of the Kansas City (Mo.) Railways. In 1918 he resigned that position to become transportation engineer with the Winnipeg (Man.) Electric Railway.

Mr. Culkins Resigns

All Cincinnati Agog Over Return of Street Railway Director to Commerce Body

Announcement was made on April 6 of the resignation of William C. Culkins as director of street railways at Cincinnati, Ohio, for the city government. At the same time James A. Reilly, president of the Chamber of Commerce, announced that Mr. Culkins would succeed Charles R. Hebble as executive secretary of that body. Mr. Hebble has held the position during the past three years.

These changes in themselves caused a considerable stir, but on the heels of this news came also intimation of dissension among committeemen representing two sets of stockholders interested in plans for the reorganization of the Cincinnati Traction Company, operating in Cincinnati, several traction lines in the state and a construction company. It will be recalled that Mr. Culkins several months ago demanded an accounting in connection with intercompany charges of $350,000 in accounts involving the Cincinnati Traction Company, the Cincinnati Car Company and the Ohio Traction Company, in transactions concerning the purchase and sale of materials, certain leases and power rentals.

This demand for an accounting, Mr. Culkins said, was necessary to determine whether or not the Cincinnati Traction Company actually had lost an amount of money sufficiently large during the preceding two months to warrant an increase of fare applied for on March 1, under the service-at-cost franchise.

To bring about a readjustment or reorganization of the traction companies, there were created at the suggestion of Mr. Culkins two special committees of stockholders, one representing the Cincinnati Street Railway and the other the Ohio Traction Company. This last company controls the operation of the Cincinnati Traction Company.

In a formal statement announcing the change, Mr. Reilly said:

> Mr. Hebble having resigned his position as executive secretary of the Cincinnati Chamber of Commerce, the board of directors authorized the president to tender the position to William C. Culkins, the present director of street railways.
>
> Mr. Culkins expressed reluctance to make a change during the pendency of the street railway reorganization which is being worked out in compliance with his order. However, after a conference with Mayor Galvin and myself, he decided to accept the proposition with the understanding that in compliance with the wishes of the Mayor he would continue in his present position, along with his new duties in the Chamber of Commerce until May 1, by which time it is hoped that the street railway problem will have been substantially solved, and with the further understanding that thereafter he is to place all of his information and services at the disposal of the city in connection with any pending suits or other litigation or questions with the traction company.

The position of executive secretary of the Chamber of Commerce will not be new to Mr. Culkins, for he held the office at the time of his appointment to the office of street railway director by Mayor Galvin.

Mr. Hebble, who has tendered his resignation, succeeded Mr. Culkins as executive secretary in 1917 and has held the office until this time. Other than to say that he had made no plans for the future, Mr. Hebble refused to discuss the affair. He entered the service of the Chamber of Commerce in January, 1914, as manager of the civic and industrial department under Walter Draper, then president of that body, holding that position until he succeeded Mr. Culkins.

Mr. Hebble will continue to fill the duties of the office until such time as Mr. Culkins is ready to succeed him.

Recent Visitor to America in New Work

Gotthard Diedon, who spent several weeks in this country last fall studying electric railway practice, has relinquished his position as managing director of the street railways of Gothenburg, Sweden. He is now director of the harbor of Gothenburg, which, like the railways, is a municipal property, and is one of the most important of Swedish harbors.

A short time ago, Mr. Diedon, in a letter to one of the editors of this paper, said that he regrets that he will not be able to put into practice the experience and new ideas obtained through his studies here. He pays a very high tribute to the personnel of American railways by saying that the industry was fortunate in having managers, engineers, and other officers of such high ability and intelligence, because the standing of the street railways in this country is considered good in view of the extraordinary conditions prevailing for the last few years.

L. A. Downs Heads A. R. E. A.

Vice-President and General Manager Central of Georgia Railway Elected at Annual Convention

Lawrence A. Downs, vice-president and general manager of the Central of Georgia Railway, was elected president of the American Railway Engineering Association at its twenty-second annual convention, held at Chicago on March 15-17. He succeeds A. Stafford as president of the association.

Mr. Downs entered railroad service in February, 1895, with the Vandalia Railroad. From 1896 to 1898 he was in the engineering department of the Illinois Central Railroad, and for nine years following was roadmaster on the Amboy, Louisville, Louisiana, Westfield and Chicago divisions of that road. From 1907 to December, 1910, he was assistant engineer, maintenance of way, of the Illinois Central. In December, 1910, he became division superintendent of the Iowa division and later of the Minnesota and Kentucky divisions.

L. A. DOWNS

In January, 1915, he was made general superintendent of the southern lines and in August, 1916, general superintendent of the northern lines of the Illinois Central. Three years later he became assistant general manager of the road. He was appointed vice-president and general manager of the Central of Georgia Railway in March, 1920.

Mr. Downs was born in Greencastle, Ind., in 1872. He is a graduate of Purdue University in the class of 1894.

E. B. Hardin was appointed auditor of revenue for the Piedmont & Northern Railway, Charlotte, N. C., on April 1. Mr. Hardin will handle all freight and passenger revenue accounts. Mr. Hardin had this position with the company until 1919, when he resigned to engage in other business, at which time this work was placed under the general auditor. His coming back at this time places the auditing work of the company on the same basis as it was previous to 1919.

H. C. Hoagland, formerly vice-president and general manager of the Central Oklahoma Light & Power Company, has resigned to become general manager of the Oklahoma Natural Gas Company. Mr. Hoagland during the last ten years has served at different times as manager of the Muskogee Gas & Electric Company, Muskogee, Okla., and the Fort Smith Light & Traction Company, Fort Smith, Ark., in addition to the position he is now leaving. All these properties are operated by the Byllesby Engineering & Management Corporation, Chicago.

Dr. E. W. Miller has been advanced by the Milwaukee Electric Light & Railway Company, Milwaukee, Wis., to fill the positions of the late Dr. Charles H. Lemon, who for twenty-five years had been chief surgeon of the company and medical director of the Employees' Mutual Benefit Association since its organization nine years ago. Dr. Miller has during the nine years that he has been connected with the company, served both the E. M. B. A. and the company as assistant to Dr. Lemon. So he has been in constant touch with the development of the association and has had much to do with the development of its medical work and other activities. The new medical director is a graduate of the University of Chicago and of Rush Medical College. He had experience in Colorado and the iron country of upper Michigan before going to Milwaukee.

Obituary

Clarence Dallam, formerly solicitor and assistant to the president of the Louisville (Ky.) Railway, is dead. Mr. Dallam was connected with the railway's legal department for about eighteen years. He resigned his position last July. He was a prominent member of the Louisville bar.

T. J. Oliver, one-time owner and operator of the railway system in Dallas, Tex., died recently in McAlester, Okla. Mr. Oliver was for years senior member of the banking firm of Oliver & Griggs, once a leading financial institution of Dallas. Mr. Oliver was eighty-seven years old. He retired from active business many years ago.

Homer J. Hodson, who was in charge of the department of safety and fire inspection of the East St. Louis & Suburban Railway Company, East St. Louis, Ill., died at the St. Joseph's Hospital in Alton, Ill., on March 6 following an operation for appendicitis. Mr. Hodson was thirty-one years old. He was well known by a great many transportation men on account of his activities in the National Safety Council. In the council Mr. Hodson was chairman of the railway section of the bulletin committee. He was also state officer of the American Legion.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Good Stocks of Lightning Arresters

Prices Steady Since Reductions of Ten per Cent—Deliveries Are Immediate. but Market Remains Quiet

Sizable stocks of railway lightning arresters are held by producers awaiting the call of car builders for new equipment and railways for replacements. Deliveries are immediate, but as yet the anticipated spring business in this line has not opened up to any great extent. Some producers are optimistic, however, and report that there has been quite an increase in sales recently, though one large manufacturer estimates that demand just now is only 25 per cent of normal. Considerable success has been met in pushing sales of the condenser type of arrester and this is more and more taking the place of old-type equipment, it is stated.

Production has generally been held to low levels as a result of the existing quiet market. In view of the prompt deliveries that can be made producers are inclined to believe that railways are holding off buying until summer and the lightning factor is actually at hand. Ordinarily it would now be growing late for this class of business to be placed. Prices have held steady since general reductions of 10 per cent were made the middle of February.

Lower Prices of Insulating Tapes and Cloth

Stocks Are Held Low Though Immediate Shipments Are Made—Manufacturers Optimistic

Although prices of insulating material in general have for some time been about holding their own, further reductions on a few items have been announced recently. A standard grade of friction tape was reduced in price 6 cents per pound on April 1, a drop of 15 per cent. On the same date all varnished cloths were reduced about 7 to 8 per cent by the same company. On March 28 another manufacturer lowered the price of woven cotton tape, the cut on the 1-in. width being from $1.42 to $1.10 per pound.

The general view expressed by representative manufacturers is that prices in this line can hardly go lower. Cotton, rubber, shellac, etc., are all at unprecedently low figures, and the general average drop on all classes of finished insulating material has amounted to at least 33⅓ per cent, according to the estimate of a well-known manufacturer. Spot cotton at New York is quoted at 12.05 cents per pound at present. Consumers, however, apparently are not yet satisfied that insulation prices have hit bottom as buying remains from hand to mouth for the most part.

Electric railways are making light repairs. Repair shops are buying such material as they need, but their present requirements are small. Manufacturers of finished products such as motors have greatly curtailed production. There is a pretty good industrial market for motor repair work, especially steel mill, at present. These outlets account for a considerable number of orders that are being received, but each order is usually small in size. There is little question that the existing market is quiet and will probably remain so for some time. Distinct optimism is manifest among manufacturers, however, as the expectation of better business persists. There has been, in fact, some slight trend toward improvement already noticed in some quarters in the number of inquiries which were received last month.

Stocks of finished material have been purposely kept rather low by producers, who have materially curtailed production under present market conditions. The supply of finished material, however, is in virtually all cases quite adequate to cover present needs with immediate shipments.

Excellent Deliveries Quoted on Special Trackwork

Producers Are Keeping Rail Stocks Rather Low—Prices Are Somewhat Lower and the Outlook Is for Improvement

Electric railways which may yet be considering coming into the market for special trackwork this spring should meet with excellent delivery conditions. At present there is keen competition for business among producers and with not a large volume of orders on hand deliveries are obtained very promptly. The average time within which manufacturers state that they can fill orders ranges from three to six weeks. For export shipment in some cases and also on some of the more complicated layouts the time in which orders can be filled extends to as much as eight weeks.

In general makers of trackwork who do not roll their own rails report they are keeping stocks of straight rail sections at fairly low levels. In view of the existing quiet market and the considerable tonnage which rail mills would still be able to take on, little difficulty is experienced in replenishing stocks. Frequently, however, especially on girder rails where the tonnage desired is often small, orders are held for a sufficient tonnage to warrant rolling.

Prices quoted on special trackwork are now lower than they were some time ago, but as each order is really an individual job it is impossible to gain a representative idea from producers as to how much prices have declined, though a minimum of 10 per cent would seem at least a very conservative estimate. Open-hearth standard T-rails are still quoted at $47 per ton, but grooved girder rails which on Jan. 5 were quoted in Electric Railway Journal at $88 per gross ton have undergone some reduction. A nominal quotation at the present time would be $75 to $80 per ton, but a price as low as $67 per ton on an order of 1,000 tons has been made recently.

Producers are generally still optimistic that business in this line will show some improvement later this year, but at the same time there is little hope that the total volume of sales in 1921 will compare very favorably with normal buying years. Steam roads, following reductions in price to $47 per ton by independent producers of standard T-rails, placed a fair amount of orders for special trackwork but have remained inactive since. Electric railways, where money has been available, have entered the market in fair number but in most cases for small repair orders only.

There are certain hopeful signs visible on the horizon, however. The seemingly inevitable ultimate reduction of wages offers an important outlet for lower costs while the need for higher fares is apparently receiving increasing legislative recognition. Steam railroads too have not yet received payment of money due them from the period of federal control and a readjustment of freight rates would very possibly increase business there.

Tenders Asked for Equipment for Railways in South Africa

Tenders are being invited, according to Trade Commissioner Stevenson of Johannesburg, South Africa, for supplying overhead equipment, switches, gears and accessory track equipment for electric railways in South Africa. Specifications covering this equipment are on file with the South African High Commissioner, Trafalgar Square, London, England, copies of which may be obtained at £5 2s. for the first copy and £2 2s. for each additional copy. Bids are to close June 22.

Window Glass Prices Drop About 20 per Cent

Production Is at Minimum and Stocks Are Not Large—A Resumption of Buying Would Push Deliveries

Effective April 1, the price of window glass has been reduced by manufacturers between 19 and 21 per cent. The new discounts announced by the American Window Glass Company, f.o.b. factory with the usual boxing charge extra, are 82 per cent on single strength, both A and B quality; 83 per cent on double strength, A quality, and 85 per cent on double strength. B quality. These compare with discounts of 77, 79 and 81 per cent respectively that have all along been quoted as the market. The above new discounts apply to the list prices dated Oct. 15, 1912.

The lowering of producers' prices will not have the effect on consumer's cost that at first seems evident inasmuch as virtually all jobbers anticipated this decrease some time ago and lowered prices on their own initiative, taking a loss for the sake of moving their stocks.

The present market is extremely quiet, with very little buying from any source, though it is said that the electric railways are ordering for repairs better than are the steam roads this spring. There are several factors in the market, however, that lead glass manufacturers to take an optimistic view of the situation. Probably the chief one is the certainty of an increased demand from the building trade before very long. Another is that there is virtually no large surplus of glass anywhere in the country at present. Some jobbers are still overstocked, but in general their efforts to reduce inventories have been successful, while the policy of glass manufacturers in cutting down production to a minimum has eliminated a surplus on their part.

Production at this time, it may be safely said, is down to about 20 per cent of capacity, or very little above even the present light consumption.

There is considerable cheap Belgian glass on the market, it is true, and in fact low-priced foreign competition has been a very important factor in the slump which the industry in this country has taken. There is, however, little or no supply of foreign glass on the market such as would affect railway requirements.

Labor prices are an important part of the cost of glass manufacture and so far as the hand workers in the industry are concerned there has been no wage cut. As the "hand-operated" factories are all shut down the wage question will probably be reopened again on their resumption of operation in the fall.

Whether wages of machine operators have been reduced or not it has not been possible to learn, but there has been no general cut, at least of the skilled workers.

General Electric's Report Shows Record in Sales

The twenty-ninth annual report of the General Electric Company for the year ended Dec. 31, 1920, shows a record of sales billed never approached by any electric manufacturing company. These billings amounted to $275,758,487, an increase of $45,778,504 over those for 1919. The net value of orders received was $318,470,438 as against $237,623,932 for 1919. At the end of the year the amount of orders unfilled, after eliminating all cancellations, was $111,778,000, compared with $98,880,000 at the close of 1919. Reduction of inventories to market values of Dec. 31, 1920, amounted to $17,803,985.

The unprecedented amount of orders received during the first seven months of the year, plus unfilled orders at the beginning of the year, resulted in more urgent efforts, in a difficult situation, to add to manufacturing facilities, and during the year the company added 2,052,000 square feet of owned factory floor space and 1,768,000 square feet leased with option to purchase. Present manufacturing space amounts to 24,501,000 square feet.

At the close of 1920, inventories at factories amounted to $93,574,114 and at warehouses, in transit, on consignment, etc., amounted to $24,535,059, a total of $118,109,174, as against $83,978,463 at the close of 1919. The following item of customers' accounts and notes receivable, carried at $64,962,682, which is an increase of $19,077,154 over the balance shown at Dec. 31, 1919, is an indication of the way bills are being paid. Total outstanding capital stock at that date was $139,026,900.

Westinghouse Air Brake Has Satisfactory Year

The Westinghouse Air Brake Company, Wilmerding, Pa., under date of April 1, has issued its annual financial statement for the year ended Dec. 31, 1920. The volume of orders received and product shipped during the year, it is stated, was satisfactory. Net profits for the parent organization and all subsidiary companies were $6,580,403, which, after deducting estimated federal taxes and dividends paid out, leaves a surplus of $1,249,122 to be added to the $14,891,457 surplus on hand as of Jan. 1, 1920.

The year 1920 closed with a fair amount of orders on hand, it is stated, but current orders show a marked falling off as compared with previous years. Manufacturing operations of the company thus far this year have been at an almost normal rate, but must be reduced materially unless there is a marked increase in new business. Considering prevailing conditions abroad the operations of the several foreign companies which the Westinghouse Air Brake Company wholly or partially controls were considered very satisfactory.

Inventories, including material, supplies, goods in process and finished stores priced either at cost or market, whichever was lower on Dec. 31, total $15,628,811. The report states that it is hoped that passage of the Winslow bill by Congress will result in payments which will reduce outstanding accounts totaling $13,550,168 to normal proportions.

Tenders on South African Railways Asked

The tenders for the conversion to electric traction of the Cape Town-Simon's Town and the Durban-Maritzburg sections of the South African Railways are due in by May 3. There are seven separate specifications relating to each line. For the first of the lines named these items are: Motor cars and underframes, motor trucks, electric equipment of cars, substation equipment, power house transformers, boilers, boiler house equipment, turbo alternators and condensing plant.

For the Durban-Maritzburg line the specifications are: Electric passenger and freight locomotives, electric yard locomotives, substation equipment, turbo alternators, boilers and boiler house equipment, condensing plant and transformers for substations and power stations.

Rolling Stock

Texas Electric Railway, Dallas, Tex., which owns and operates the street-car system in Corsicana, Tex., has purchased three new one-man cars for service there. With these cars, a fifteen-minute schedule will be maintained on the city lines.

Track and Roadway

Kentucky Traction & Terminal Company, Lexington, Ky.—Chief Engineer McLeod has informed the Commissioner of Public Works that the Kentucky Traction & Terminal Company will begin work as soon as the weather permits on track repairs.

Detroit (Mich.) Municipal Street Railway.—F. M. Meyer, city purchasing agent of Detroit, is in Spokane inspecting poles and arranging for a contract award for 3,000 poles, 35, 36 and 40 ft. long. The purchase calls for an expenditure of about $65,000.

Trenton, N. J.—The Trenton (N. J.) City Commission has instructed the Trenton & Mercer County Traction Corporation, the New Jersey & Pennsylvania Traction Company and the Public Service Railway to improve the paving on streets in Trenton where their lines run.

Oklahoma Railway, Oklahoma City, Oka.—The Oklahoma Railway is making track improvements in the downtown section of the city which will cost approximately $4,000.

Memphis (Tenn.) Street Railway.—The Memphis Street Railway expects to have to reconstruct about 2,200 ft. of double track and 2,000 ft. of single track on North Second Street. This is now T-rail and will be replaced with girder rail. The reconstruction will be necessary to meet the city's plan of repaving the street, using asphalt.

Memphis (Tenn.) Street Railway.—Track improvement, which will provide for the rerouting plans contemplated by the Memphis Street Railway, will be started about April 15. Commissioner Johnson has stated that the work was waiting for the delivery of curves, switches, etc.

Dallas (Tex.) Railway.—The Dallas Railway will begin work on the extension of its line on Fairmount Street, that will reach the Parkland City Hospital, near the middle of April, according to announcement by Richard Meriwether, vice-president and general manager. The line will extend out Fairmount Street to Oaklawn Avenue within one block of the city hospital. Work has been held up on account of bridge work on Turtle Creek. It is expected that the line will be completed within five months. This is one of the extensions for which the Dallas Railway is committed under the terms of its charter.

Indiana Service Corporation, Fort Wayne, Ind.—The Indiana Service Corporation has agreed with the International Harvester Company to extend the line to the company's big new truck plant east of the city as soon as the plant is completed.

Power Houses, Shops and Buildings

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company has rebuilt its Second Street, Winston-Salem electric power station and has equipped it with modern transformers. Already $150,000 has been spent and many thousands more will be expended in completing the reconstruction and redistribution improvements.

Mobile Light & Railroad Company, Mobile, Ala.—The Mobile Light & Railroad Company has under contract with the Westinghouse Electric & Manufacturing Company a 1,000-kw. turbine and 550-600-volt generator with condenser. The company has completed a steel and concrete carhouse 100 ft. x 200 ft. having eight inspection pits together with a large amount of yard storage. An office for the transportation department has also been completed.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—A new power substation will be constructed at Curtis, Utah, on the Salt Lake & Utah Railroad this summer, at a cost of $50,000. Curtis is 5 miles north of Provo, on the main line of the road, and this will be the fifth substation on the line between Salt Lake and Payson, the other four being at Granger, Bringhurst, Lindon and Springville. The new power substation is expected to be completed by September.

Trade Notes

The Standard Paint Company, 95 Madison Avenue, New York City, manufacturer of weatherproofing products, announces a change in its corporate name to the Ruberoid Company.

E. I. Du Pont de Nemours & Company, Inc., is putting out uniform caps made of pyroxylin coated goods (leather substitute) which is waterproof and made in colors to match the uniform.

The Conveyors Corporation of America, Chicago, announces the appointment of Robert B. M. Wilson as sales engineer of the Chicago district, with E. M. Wolfe associated with him as an assistant.

The Universal Crane Company announces the removal of its plant from Cleveland to its new factory at Elyria, Ohio. The company has greatly increased its capacity and production is now under way in the new plant.

Daniel J. P. Jones, formerly connected with the Chicago office of the Economy Fuse & Manufacturing Company, has been appointed sales representative of the company in Michigan and will have his headquarters in Grand Rapids.

E. G. Le Laurin has resigned as Southern sales representative of the Southern Supply & Hardware Company, St. Louis, to become associated with W. D. Jenkins, representative for railway equipment and supplies, Dallas, Tex., looking after the Dallas-Houston-New Orleans territory.

The Hopewell Insulation & Manufacturing Company, Hopewell, Va., announces that it is now represented in Chicago by the Midstates Engineering Company, Westminister Building, which company takes in the district of Ohio, Indiana, Illinois, Michigan, Missouri and Wisconsin.

The Barney & Smith Car Company, Dayton, Ohio, will not be funded under the plan described in the March 19 issue for financing the working capital requirements of the company by an issue of $2,000,000 second mortgage, 7 per cent bonds. An insufficient amount of subscriptions were received and other measures will have to be devised for the continuance of the company's business. Directors of the company will meet next week to consider further steps toward clearing up the company's finances.

The Under-Feed Stoker Company of America, Book Building, Detroit, has placed its Western selling agency with the Merkle Machinery Company, of Kansas City. The selling agency has branches in Omaha, Neb., and Tulsa, Okla., selling, designing and installing machinery for power and pumping plants. The Salt Lake City agency has been placed with N. L. Alison, 616 Newhouse Building. The company also will be represented in the Southern territory through Smith & Whitney, Southwestern Life Building, Dallas, Tex.

A. J. Manson has been appointed manager of the Railway Division, New York office of the Westinghouse Electric & Manufacturing Company. After graduating from Massachusetts Institute of Technology in 1905 Mr. Manson entered the company's engineering apprenticeship course. He was active in the electrification of the New Haven Railroad and the Pennsylvania Railroad into New York City and during the past few years has been connected with the sales organization in New York.

Engineering Business Exchange, New York, announces the opening of a Southeastern branch with Marshall O. Leighton, consulting engineer, of Washington, D. C., as director. Mr. Leighton was for a dozen years one of the principal officers of the United States Geological Survey. During the past three years he has been chairman of the National Service Committee of the Engineering Council. Associated with Mr. Leighton in carrying on the Exchange will be A. C. Oliphant. The Southeastern branch of the Engineering Business Exchange has offices in the McLachlen Building, Washington, D. C.

New Advertising Literature

Seats.—The J. G. Brill Company, Philadelphia, Pa., has issued leaflet No. 248, describing "Brill Seats for Motormen and Conductors."

Rails.—The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued bulletin No. 9 in its series of reports on open-hearth rails.

Pulverized Coal.—The Fuller-Lehigh Company, Fullerton, Pa., is distributing bulletin No. 600, entitled "Pulverized Coal for Boilers."

Brush Holders.—D. B. Flower, 1217 Spring Garden Street, Philadelphia, is distributing two leaflets covering different types of Flower brush holders for industrial motors.

Metal Statistics. — The fourteenth annual edition of the Metal Statistics, 1921, has been published by the American Metal Market and Daily Iron and Steel Report, 81 Fulton Street, New York City.

Damper Regulator.—A new hydraulically operated damper regulator for boiler pressure up to 250 lb. has recently been developed by the Atlas Valve Company, 282 South Street, Newark, N. J.

Electric Locomotives.—Westinghouse Electric & Manufacturing Company has issued a pamphlet on the electrification of the N. Y., N. H. & H. R. R., with especial reference to the road's six latest electric locomotives which are described.

Transmission Towers. — Archbold-Brady Company, Syracuse, N. Y., has published a booklet illustrating and describing the transmission lines of the Niagara Falls Power Company constructed by it, which involved some special engineering problems.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, April 16, 1921 *Number* 16

A Franchise Is Not Always a Contract

THE decision just rendered by the United States Supreme Court in the case of the San Antonio Public Service Company should help materially to clarify the situation in regard to the power of cities in Texas over the rates of fare of the local railway companies. The full printed decision of the court is not available at the present time, but digests received from Washington indicate some of the facts. Briefly, it might be said that the court affirmed a decree of the Texas District Court enjoining the city of San Antonio from requiring the company to carry passengers for 5 cents, with universal transfers, as called for in the company's franchise.

In its decision the court analyzes the franchise of the company and the conditions under which it was granted and whether the two parties thereto had the independent status which would bind each, and it finds that this is not the case with the city, because of a provision existing in the State constitution at the time that the franchise was granted prohibiting any city from making "any irrevocable or uncontrollable grants of special privileges, etc." In these circumstances the court, as in previous cases of a similar kind which have come before it, declared the company was not bound by the rates specified in the franchise but could charge a reasonable rate.

It is difficult to determine the effect which the decision will have on rate cases elsewhere, but at least it seems to sustain the idea of the dependency of the city on the State for power to make franchise contracts with public utility companies and also the right of the company to charge a reasonable rate when there is no franchise or when the city does not have the power to enter into an agreement specifying an irrevocable or uncontrollable rate.

How Can the Efficiency of the Shop Personnel Be Increased?

ALL admit that the efficiency of the various working forces required in electric railway maintenance deteriorated to a considerable extent during the war period when labor was at a premium. Those in charge of the work had to take whatever labor they could get and be satisfied with it. If this waste in efficiency could be computed in dollars and cents it would astound most of us, and the bringing back of this efficiency is a result which is needed today perhaps more than anything else.

The efficiency of any body of men depends to a large extent on the manner in which it is directed. A capable and efficient foreman can do much toward increasing the spirit of co-operation and toward toning up the entire working organization. The selection of foremen should not be left to chance, but the most efficient workmen should be trained to fill vacancies whenever they occur. Of course the most capable workmen do not always make the best foremen, but if a promising employee has a chance actually to direct the work in the capacity of acting foreman when it becomes necessary for the regular foreman to be absent, a general idea can be formed as to the man's ability to develop team work and to inspire methods that will produce results.

Another thing that is sure to produce efficiency in an organization is the use of a piecework system. A piecework basis is not easy to establish in electric railway work, but some of the large roads have introduced this in a number of their departments with marked success. A piecework basis is also much easier to establish on a large railway property than on a small one, as there are more operations which are similar occurring continually, and unless there is enough of the same or similar work being done the establishment of a piecework basis is almost impossible. Thus, take the various steps in the dismantling and rewinding of an armature. The work and time necessary for stripping similar armatures is almost identical, and this could be readily placed on a piecework basis, but unless there is enough of this work to keep a man almost continually employed the efficiency resulting from familiarity in doing the same class of work is lost. This is an opportune time for railways to analyze their needs and introduce practices that will produce results.

The American Engineering Standards Committee a Going Concern

THE forthcoming annual report of the American Engineering Standards Committee contains evidence that the organization is functioning, and that it has secured the allegiance of enough national engineering bodies to give ponderable weight to its stamp of approval.

It will be worth a great deal to the country's industries, in the way of conservation of material resources and mental energy, thus to have a clearing house for engineering standards and a co-ordinating force tending to rationalize these standards. Various branches of industry have been struggling, largely alone, to save themselves money and effort through standardization. This is illustrated by the standardization work of the American Electric Railway Engineering Association, which centralizes in its committee on standards. A large part of the work of the several committees of this association has to do with standardization. In spots this overlaps and hence partially duplicates the similar work of other associations. Consequently when the plan and scope of the A. E. S. C. were put before the executive committee of the Engineering Association, a request for enrollment was promptly forwarded to the parent American Association, which in due course enrolled. It now heads the list of members (in alphabetical order), which typographical position it is hoped may be symbolic of a leading part in the Standards Committee activities.

When one considers the vast sums which have been spent in joint committee meetings representing interests which have desired to get together on standardization matters, he cannot but realize that the American Engineering Standards Committee has a real field for its operations. A careful reading of the abstract of the annual report, which is given elsewhere in this issue, will convince even the skeptical that constructive work in this field is actually being done. For its financial support the committee will have to appeal outside of its membership dues, but funds will be forthcoming as soon as the results shall have shown themselves to be immediately or potentially profitable to industry. It is now up to the electric railways and other supporters of the national movement to make use of the results already achieved and to use the committee's facilities to expedite their own standardization plans.

Don't Be Too Mechanical in Rating Men

ON ELECTRIC railway properties, as with all corporations employing large numbers of men, the tendency is toward careful organization of the personnel. This is right and necessary if the best results are to be secured from the large expenditure for labor and administrative talent. On the other hand, system is not good if it is permitted to take the place of that personal contact and human interest which is the basis of first-class organization.

The danger of over-systematization is not only that the relations of men and supervisory officers may become mechanical and hence inefficient, but also that the real qualities of men may not be appreciated. An example of this, which in fact provoked the present comment, came to light recently. It developed that a certain electric railway department head who has now achieved an unusually good reputation for getting things done and done well was formerly employed in an organization in which the men were carefully "card catalogued." This man's record card bore the significant legend, "N. G., Do not rehire." The trouble in this case was simply "too much system." Superficial qualities here apparently had been used as a basis of rating, with the resulting anomalous and false estimate of the real worth of the man, or the wrong label may even have been attached to his record.

The incident just mentioned is quoted to indicate a danger in organization and not to ridicule systems of classification, including those employing the ubiquitous and highly useful card catalog. Not at all! Only the card catalog and the clerical staff behind it cannot be expected to serve as more than mere recorders. They cannot put in the personal touch.

Surface Trunk Lines Make for Speedier Service

IN MOST cities practice has decreed that all routes from the various outlying corners of the city converge at some downtown central point. In order to get the cars through the center of the city with a minimum of delay to the traveling public, through routes are operated connecting the various parts of the city where investigation has proved that there is a large traffic interchange. This plan has developed routes of considerable length. It brings up the question, is there a limit today to the length of urban route that can be operated so as to give adequate service?

Lately much has been said about distributing centers for l.c.l. freight, and this suggests that the idea embodied in the l.c.l center can be applied with advantage to many urban passenger transportation systems, if passengers will pardon the comparison of themselves, for this purpose only, to l.c.l. package freight. This plan has been recommended in several places in the past for handling what might be termed "the neck of the bottle" traffic.

In Cleveland surface trunk line operation has only recently been suggested as a means of improving the transportation facilities to the northeast factory district. At present all routes serving this section vary in length from 9.6 to 10.6 miles and loop at the public square for the return trip. The routes are becoming so long, however, due to periodic extensions, that it is becoming more and more difficult to maintain the proper scheduled speed. The plan calls for trunk lines operating multiple-unit trains to specific distributing points in the heart of the district served. Such operation makes short routes from the distributing points to the outlying residential districts—routes that can be operated with lighter and smaller capacity equipment on headways determinable only by the traffic originating on each outlying route. Trunk line service can then operate on two bases, either with an all-day fixed headway, with the length of trains varying with the traffic demands, or with service of two or three-car multiple-unit trains running on shorter headway during the rush hours.

Motor Trucking Not Yet a Science

THE discussion at the March meeting of the New York Electric Railway Association covering electric freight and express indicates pretty clearly that all is not well when motor trucking is done at less than cost. To get at the facts of the situation one need only mingle a bit with the motor truckers themselves and listen to stories which are related, from cheerlessness only, to the pious hope that steam railroads will continue to seek higher rates for slower service and thus indirectly give the trucks a chance.

In the congestion and embargo days of the war and shortly thereafter motor trucking went through all the mushroomlike growths made so familiar by the passenger jitney. Any man with $500 or so had a dozen salesmen on his doorstep ready to sell him a truck on a year or two years' time and then to guarantee him business to boot. For a time all went well. There was no trouble in getting full loads going and coming and at any price a desperate shipper would pay. Yet long before the present depression, the less experienced motor truckers began to fall by the wayside—this period coming when it was necessary to put the truck through its first overhaul. Then the operator discovered that such a thing as "repairs"—not to name the remoter "depreciation" and "interest on investment"—had to be figured into costs.

Today, with 300,000 idle freight cars and no hurry calls for materials, the best of motor truckers are at their wits' ends. Traffic at their rates has dropped to one-fourth or less of the old days, but the overhead goes on remorselessly.

Where there is a chance for the truck to serve better than the rail the motor trucker by profession, *i.e.*, the common carrier, finds the ground cut from under him by the so-called occupational truckman. For example, a fruit dealer running empty one way will call up shippers and offer to take loads into town for any old price. On his return trip, carrying only his own wares to capacity, he is not interested in soliciting business. There is such an amazing amount of this sort of thing, besides the competition of one-truck operators who are "eating up their trucks," that the only way out is recognized to be the placing of the motor truck on the same basis of regulation as a railway. This is not the place to argue why, but it is safe to say that this desired regulation of motor trucks is one of the logical steps toward placing all freight carriage in a district under one transportation head that can and will find the way to secure the constructive co-ordination instead of the destructive competition of essential transportation media.

He Who Writes Specifications Should Know Materials

IF SPECIFICATIONS for electric railway supplies are to be prepared intelligently the framers thereof must be somewhat expert regarding the materials which they specify. This is particularly true regarding wood, steel, copper, zinc, tin and alloys, insulating material, wood and paint. Even where standard specifications are utilized it is desirable that they be used with full knowledge of the characteristics of the materials involved. Unfortunately for manufacturers and purchasers, the ideal in this direction is not yet reached, and impossible, impracticable or uneconomical designs, dimensions and strengths are frequently demanded by those who write the specifications.

To ameliorate this condition the editors of this paper more than a year ago arranged with Norman Litchfield to prepare a series of articles on electric railway materials, particularly those mentioned above. His experience, both as a railway engineer and an engineer with a car building company, combined with a thorough technical training, gave him an excellent background for this task. His first article appeared in the mechanical and engineering number for Feb. 21, 1920, and the concluding article, on insulating materials, appears this week. Taken as a whole this series forms a notable contribution to the subject covered, because the author has not only gathered together the recommendations of the several engineering associations as to the characteristics of materials and the fundamental data relating thereto, but has blended his own observations and deductions therewith.

Now that the series is complete, the articles should be reviewed by electric railway engineers; they should be recommended for study to ambitious young men in the technical departments; they should be consulted when new specifications are being drawn up or old ones revised; and they should be reread by purchasing agents who are responsible to a considerable degree for the qualities of supplies which are purchased. There is danger that good reference text like this may be examined approvingly but filed away and forgotten. It does not deserve such a fate, nor is it economical for the railways to allow such a fate to overtake it.

Quotation from the Federal Electric Railways Commission Report

No. 16

THE original failure of the electric railways to vary their rates of fare for transportation service, based upon the length of the ride, as services in all other lines of business are sold, is, in our judgment, one of the contributing factors to their present financial condition. The electric railway industry is the only public utility which, as an industry, has consistently adhered to a flat basis. Steam and suburban roads charge on a distance basis. Gas, power, electric and water power companies, generally, make their rates upon a measured basis, subject to a minimum charge per month, and the telephone company grades all toll messages on a mileage basis, while observing in most cases a flat rate per month for local service. Whether or not under present conditions it would be to the interest of a community to introduce a zone system of fares, instead of the present flat fare system, is a question which we think should be decided by the community itself, having reference to the social problems involved.

What if There Is No Exhibit This Year?

BY THE TIME this line meets the reader's eye, a decision will presumably have been reached and announced by the executive committee of the American Electric Railway Association as to the holding of an exhibit in connection with the annual fall convention. If the decision is favorable, there is no doubt that the supply men will pitch in with a will to make it the best exhibit in the series. If, however, it has been deemed expedient to postpone the exhibit for a year, as many members believe should be done, there will arise a new query, namely, as to the best location for the meeting. A few reflections based on the no-exhibit contingency cannot be considered academic in view of the circumstances.

Going to Atlantic City for conventions has become a habit with many organizations, including the American Electric Railway Association, partly if not largely because the "Million Dollar" Pier there furnishes a unique and well-arranged structure for a combined meeting and exhibit. There are numerous cities which are supplied with excellent hotels, meeting places and exhibit halls, but there is none which can meet the need for a combination of the three to equal Atlantic City.

When an electric railway convention without an exhibit is to be held the pre-eminence of Atlantic City as a meeting place disappears. There are many reasons for going elsewhere, not the least of which is minimizing of traveling expense. There is some point on the map for which the sum total of this item should be a minimum. The mathematically inclined could figure this out, given the necessary data. Everything else being equal, a convention site somewhere near the "center of gravity" would be highly desirable. Then, again, if the meeting place "happened" to be one where a well-arranged railway was the joy of the local populace, an opportunity would be appreciated for getting some good points on construction, operation and maintenance, as was pointed out in an editorial last week. In other words, the system would be an exhibit.

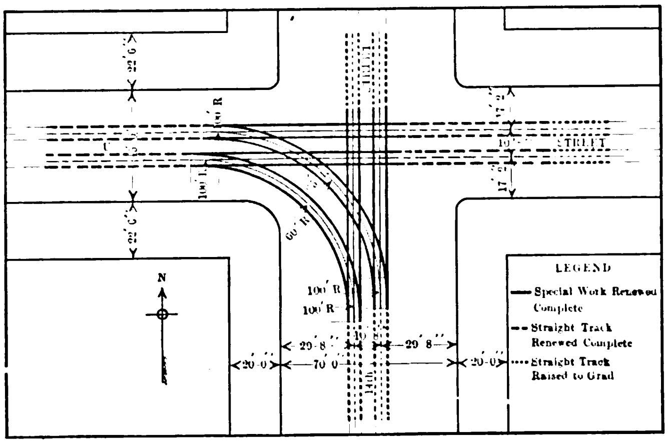
A byproduct of a meeting in an electric railway center would be the impression created therein by the gathering of representative transportation men. Undoubtedly a good convention without exhibits could be held at Atlantic City, but the additional advantages already mentioned possessed by a mid-Western city like Chicago, Indianapolis or Cleveland are worth consideration.

Large Special Trackwork Renewal

The Entire Layout at Fourteenth and U Streets, N. W., Washington, D. C., Was Renewed and Additional Special Work Was Installed by the Capital Traction Company Without Interfering with the Regular Operation — The Surface Work Was Set Up on an Adjacent Lot Before Installation to Insure Rapid Assembling

BY E. P. GOUCHER
Assistant Engineer Capital Traction Company, Washington, D. C.

THE Capital Traction Company, Washington, D. C., recently completed a renewal of the entire special trackwork layout at Fourteenth and U Streets, N. W., which, as shown in the accompanying diagram, consists of a double-track crossing and a double-track connected branch-off shown in heavy lines. In addition to the special trackwork, 231.15 feet of single track on U Street was completely rebuilt, as shown by dash lines, and 133 feet of single track on Fourteenth Street and 68 feet on U Street was raised to a new grade, as shown by dotted lines. The entire job was of the underground conduit type of construction used exclusively in Washington.



SPECIAL TRACKWORK RENEWAL IN WASHINGTON, D. C.

This street intersection is one of the busiest in the city as regards traffic, both car and vehicular, especially during the morning and afternoon rush hours. It was therefore of extreme importance that the work be completed as quickly as possible. Every effort was made to this end, and as a result the job was completed, including all paving, in sixty-six working days.

The special trackwork was furnished by the Lorain Steel Company, being fabricated from dimensions and angles obtained by a careful survey of the site. The special surface work is of cast steel throughout, with the exception of a few rolled rails in the connecting curves and tangents. All the wheel frogs are made with renewable cast manganese steel center plates. All the yokes, gussets, etc., composing the substructure are of gray cast iron with machined surfaces to receive the surface work.

The outside curve (the one nearer the crossing) was relocated to give more clearance between cars passing on the curves, the balance of the layout remaining practically the same as the previously existing work. The new material was hauled to a large vacant lot one block from the job, and there the surface work was set up complete in the same relative position in which it was to go in the street, as shown in one of the accompanying photographs. Measurements were taken to permit the cutting of the existing work to suit the new; conductor bars were bent, cut and bonded, and make-up rails were cut and drilled. All make-up rails and compromise plates were numbered to facilitate installation work at night.

The removal of the old concrete and steel substructure on renewal jobs of this type of construction is the most difficult part of the work, especially at such an intersection as that at Fourteenth and U Streets, where the car traffic is very heavy. At the time this job was under way an average of 725 cars passed on the Fourteenth Street tracks, 492 on the U Street tracks and 107 went around the curves during the eight-hour period in which the gangs were working, making a total of 1,324 cars in all directions, or one about every twenty-two seconds. During the rush hours in the morning it was necessary practically to suspend all work on the street. By starting work at 6:30 a.m., however, the evening rush was avoided.

Pneumatic tie tampers equipped with chisel bits were used in removing the old pavement. Holes were then drilled through the paving base and the concrete tube, using pneumatic drills with 1¼-in. bits, and the greater part of the concrete was broken away with bull points and 16-lb. sledges. The concrete remaining on the old yokes and castings was removed with chisel-bit tie tampers. Pneumatic tools operated by efficient labor and in charge of a foreman who understands his job are almost indispensable on work of this kind.

As excavation progressed, vertical 6-in. x 6-in. timbers were placed under the old rails and castings and wedged tightly in place, and as soon as a section was completely excavated and ready for the new special trackwork a concrete slab or "floor" about 6 in. or 8 in. thick was poured so as to clear the bottoms of the deep-

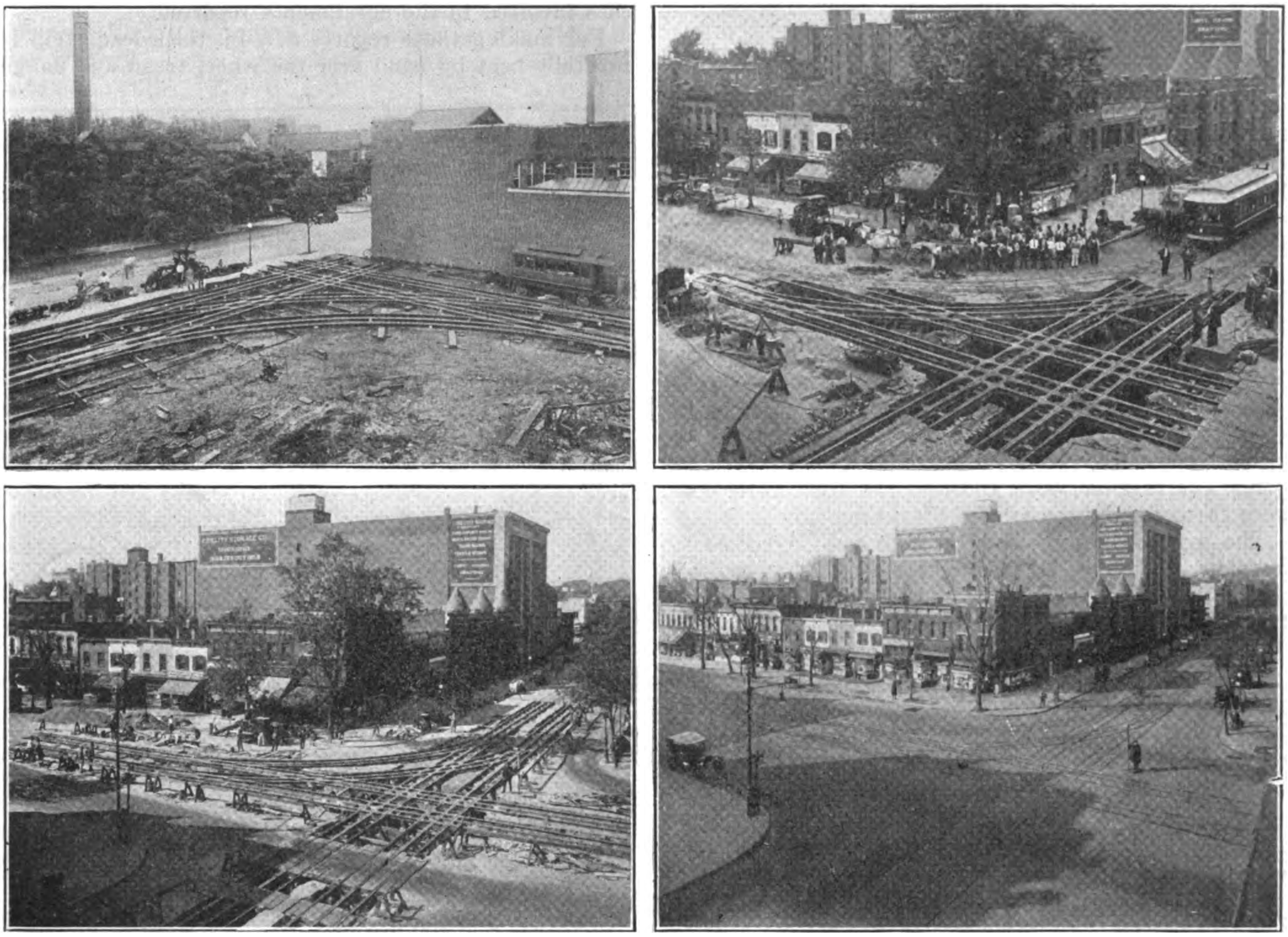
DETAIL COSTS OF LABOR AND MATERIAL

Class of Work	Labor and Hauling	Material	Total
Engineering and superintendence......	$648.71	$67.39	$716.10
Excavation........................	5,814.08	....	5,814.08
Special trackwork	....	42,415.00	42,415.00
Steel work at night.................	1,625.07	....	1,625.07
All other steel work................	2,307.21	1,313.90	3,621.11
Form work.........................	1,460.24	386.53	1,846.77
Concrete tube construction...........	759.37	1,927.28	2,686.65
Conductor bar......................	500.49	1,080.94	1,581.43
Paving base........................	203.63	351.63	555.26
Track drains.......................	276.70	81.05	357.75
Watchmen, tools and sundries.........	2,681.82	444.09	3,125.91
Paving............................	452.98	616.94	1,069.92
Raising Fourteenth Street tracks......	1,615.55	542.50	2,158.05
Underground obstructions............	22.73	72.22	94.95
Gross total cost................	$18,368.58	$49,299.47	$67,668.05
Credit from scrap, including cost of handling.........................	132.51	1,703.19	1,570.68
Net total cost of special trackwork....	$18,501.09	$47,596.28	$66,097.37
Rebuilding 231.15 ft. on U Street, including raising tracks on U Street.....	4,883.84	2,625.20	7,509.04
Total cost of entire job............	$23,384.93	$50,221.48	$73,606.41

est of the new yokes. This necessitated the complete renewal of some of the old yokes before the placing of the concrete, as many of the old yokes were deeper than the new ones to be installed. Forms about 12 in. square were placed around the bottoms of the supporting timbers. The level pouring of this floor greatly facilitated the setting up of the new yokes during installation work at night and also served as a spread footing under the entire job.

It was necessary to install the new work in three sections. The crossing was installed first, the outside curve, including both branch-offs and both curved crossings, next and the inside curve and branch-offs last. As all our installation work has to be done between 1 and 5 p.m., it may readily be seen that the installation of the outside curve was quite an undertaking for one night. This was necessary, however, because of the relocation of this curve, as mentioned before. But due to the splitting up of the gangs and their distribution over the entire curve no difficulty was experienced and the first car went over on schedule time, three hours and thirty-seven minutes after the removal of the old special trackwork was started. Car traffic was not delayed at any time during the progress of the job, with the exception of two or three minutes' delay due to stopping of cars on cut-outs.

Night work was greatly facilitated by the preliminary survey work of the company's engineers. Every yoke and gusset was "tied" out by offset nails in the asphalt street and grade stakes were set on the "floor" of the excavation at the exact elevation of the bottoms of the new yokes. After the old special trackwork had been removed and the "hole" cleaned out, the new yokes were placed in almost their exact locations by means of a chalk line and tape used in connection with the offset nails. They were then wedged up to the grade of the stakes. As the new yokes were of different depths and the floor was level it was necessary in some places to lay pieces of old girder rail on the "floor" upon which to set the new shallow yokes. These rails were placed to the proper grade, so that it was necessary only to set the yokes to line.



AT TOP, LEFT, SURFACE WORK SET UP ON LOT PRIOR TO INSTALLATION. AT TOP, RIGHT, EXCAVATION IN STREET JUST BEFORE INSTALLATION OF NEW CROSSING. AT BOTTOM, LEFT, NEW SPECIAL TRACKWORK COMPLETELY INSTALLED. AT BOTTOM, RIGHT, ALL WORK COMPLETED, INCLUDING PAVING

The new work, also supported by the 6-in. x 6-in. timbers placed under the wheel rails, was surfaced and lined as quickly as possible after installation, the grades were checked by the District Engineer Department and concrete was poured around the bottoms of the yokes and gussets. This "sticking," as we call it, is to hold the new special trackwork in position while forms are placed for the conduit construction and the concrete conduit is poured. It is one of the most important phases of the work. The entire weight of the new steel and heavily loaded cars must be carried by the timbering and vibration reduced to a minimum, in order to prevent the yokes "working" while this concrete is setting. Several men with hammers and wedges watch the timbering and at the slightest sign of movement in the rails or yokes tighten the wedges at the proper point, or place another upright and wedge it securely in place.

Construction of the formwork for the conduit construction on a renewal job of this kind is a very tedious job, as conditions prevent the standardization of forms to any extent, thus requiring special forms almost entirely. The underground conduit or "tube" construction on the special trackwork only of this job required approximately 233 cu.yd. of 1: 2.5: 4.5 concrete which cost $8.15 per cubic yard for material and $3.26 for mixing and placing. The forms for this concrete cost on an average of $7.92 per cubic yard of finished concrete, $6.13 of which was for labor. The excessive cost of concrete material as indicated by these figures was due to a cement shortage which occurred at the time this job was under way.

The new paving installed consisted of Durax granite block in the larger areas, with Kreolite wood block in and around the switch and crossing castings. Paving outside the rails was Scoria block laid as headers, with sheet asphalt outside. A total of 680 sq.yd. of new paving was installed. All the block paving was laid on a 1: 4 cement and sand cushion 1 in. thick, with pitch as a filler.

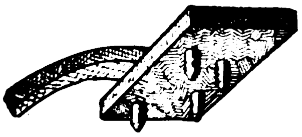
This special trackwork layout was originally installed complete in 1899. In 1910 it was necessary to renew the surface work only of the double-track crossing, but the balance of the surface work and all of the substructure removed in 1920 was part of the original installation, which had been in service under heavy traffic for about twenty-one years. This is rather a long life for special trackwork of this underground type of construction. The original work and also the crossing renewal were furnished by the Lorain Steel Company.

The original installation in 1899 cost about $9,020 complete, $6,100 of this being the cost of the special trackwork only. The surface renewal of the crossing in 1910 cost about $4,058, of which about $3,200 was for the special trackwork.

The accompanying summary shown on the preceding page gives the costs of the 1920 renewal complete by labor and material on the different classes of work for a total length rebuilt in the special trackwork of 535.23 ft. single track.

Cant Hook for Concrete Poles

THE ordinary cant hook used for wooden poles is not only decidedly unhandy on concrete ones but also is even dangerous to use. The single prong often chips out a large piece and has occasionally caused the ruin of a new pole. To obviate this disadvantage, according to an article published in the January bulletin of the Utilities Mutual Protection Company, a new type of hook with a special foot has been developed. This has four teeth set into the face plate in the manner shown in the accompanying cut. By increasing the points of contact and extending the strain on the concrete over a distance of about 6 in., this device will handle even the softest "green" pole without damage and without risk of dropping the concrete pole unexpectedly.



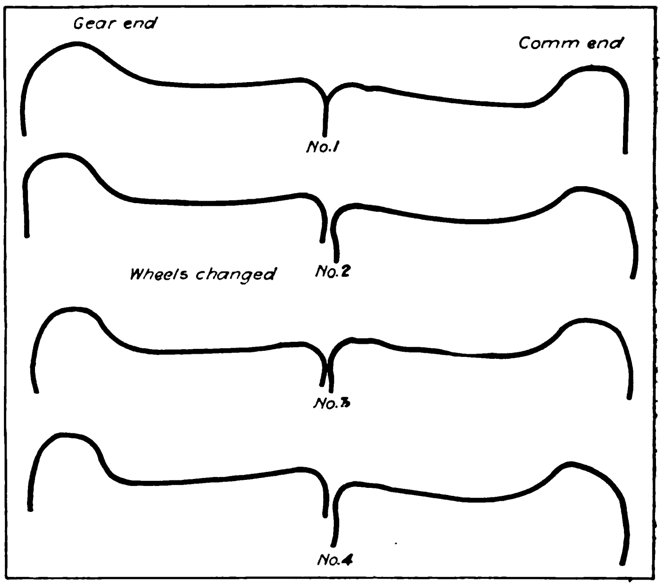
STUDDED FACE PLATE FOR A CANT HOOK

The hook is the invention of Mr. Jennyjohn of the Rochester Gas & Electric Corporation.

Testing Wheels for Flange Contour

A CAREFUL check-up on all cars involved in derailments on the Chicago Surface Lines has been inaugurated by H. H. Adams, superintendent of equipment, with a very good result as to the number of such causes of delay. Whenever a derailment occurs the car crew reports the incident to the company switchboard operator and a daily report of all such derailments occurring over the entire system and giving the time, place, nature of the accident, etc., is made up and copies sent to the track, transportation and equipment departments. The carhouse foremen are called from the equipment superintendent's office each day and asked to report on the condition of the wheels on any cars involved in the derailments reported.

For making these reports a $\frac{1}{16}$-in. thick lead strip is carefully bent by hand over the wheel tread and flange in order to get the exact shape of the contour and determine if any of the car wheels were responsible for the derailment. After one of the lead strips is formed over each wheel the eight strips are inked from an ordinary pad and stamped on the report sheet, whereby the contour of each of these wheels is accurately reproduced. If any bad wheels are indicated the foreman notes on the report what he is going to do, if anything, and forwards the report to the main office of the equipment department, through the division master mechanic. If the foreman has not ordered a proper or adequate repair he receives instructions from his superiors. The foreman also inspects the center and side bearings while he is getting the wheel contours and reports on these.



INSPECTION REPORT OF WHEEL CONTOUR ON CAR REPORTED DERAILED

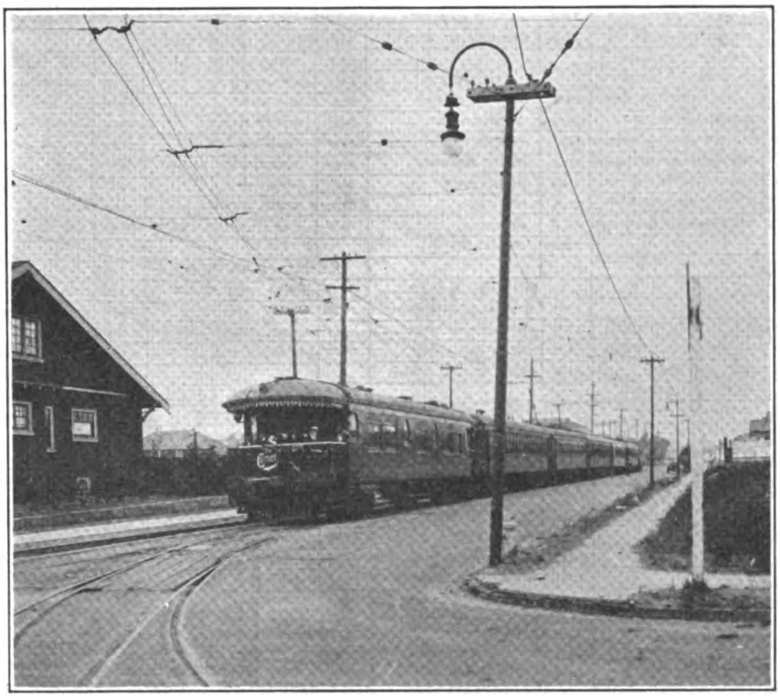
A further step taken in minimizing the derailments was the plotting on a large map of the city the location as reported of all derailments. If these occur in clusters, this fact shows up at once and a special investigation of the situation there follows. Division and system curves showing the number of derailments are also now being maintained, and since the new scheme of inspection was started derailments show a decided downward trend. The moral effect of this follow-up is that the foremen are induced to keep a more careful watch of the wheels on the cars under their jurisdiction in order to avoid the recording of bad wheel accidents against them.

Maintenance Cost Accounting

System Used by San Francisco-Sacramento Railroad Has Proved Invaluable as Means of Supplying Actual Cost Data from Which to Decide Whether Maintenance of Various Parts of Equipment Is Satisfactorily Carried On in Relation to Road Performance

BY E. A. PALMER
Manager Railway Division San Francisco Office, Westinghouse Electric & Manufacturing Company

THE "Sacramento Short Line," formerly known as the Oakland, Antioch & Eastern Railway, operates a heavy traction, high-speed, 1,200-volt, direct-current electric passenger and freight service between San Francisco and Sacramento, California, and intermediate points. The rolling equipment comprises twenty passenger motor cars, weighing approximately 46 tons each, equipped with four Westinghouse 120-hp., 600-1,200-volt motors and type HL multiple-unit control, also six locomotives used mostly in freight service and a number of passenger trailers and standard box cars.*



TYPICAL TRAIN OF SAN FRANCISCO-SACRAMENTO RAILROAD

In 1920 this equipment made 1,616,316 passenger car-miles on the 117.2 miles of track with a total of twenty-six delays, averaging 25.7 minutes, from all causes chargeable to the rolling equipment department. This is at the average rate of 62,166 car-miles of service per detention. The distance between terminals, namely, 90 miles, or 164 train-miles per round trip, from the shop in Oakland, necessitates the highest standard of equipment maintenance possible.

A typical train pulling out of the Oakland station is shown in the headpiece of this article. The schedule speed at which these trains operate is approximately 30 miles an hour, including all stops and slow-downs.

Having in mind the service conditions and the management's requirement that superior time-table performance of equipment, combined with comfort and safety, be furnished the traveling public at a minimum expense, Frank A. Miller, superintendent of power and equipment, undertook in 1914 to install a cost accounting system that would fulfill the following conditions:

1. Conform to the requirements of the Interstate Commerce Commission.

2. Be acceptable to the auditing department of the railroad by accounting for all money disbursed.

3. Furnish accurate segregated cost data for the analysis of the performance of any desired part of equipment for any day, month or year.

4. Totalize the amounts spent progressively either on payroll or material account from the first of each month so that clerical work would not be greatly increased as a whole or at the end of the month.

The system as now in effect, in addition to fulfilling the requirements, has been invaluable as a means of supplying actual cost data with which to decide whether the maintenance of various parts of the equipment is being satisfactorily carried on in relation to the road performance. The basis of segregation of all charges for labor and material which are expended in equipment maintenance is a blueprint schedule entitled "Shop Order Numbers," as shown. The list contains fifty-three main headings, which in turn are itemized into the details upon which specific costs are desired. Each item is given a Shop Order Number, the first two digits of which correspond to the Interstate Commerce Commission account, to which the expense is chargeable. The last two digits give the index to the subaccount. This chart has three features which should be noted:

1. There is a "Shop Order Number" on the chart to which every dollar spent on the annual maintenance budget may be segregated.

2. There are no non-specific "Miscellaneous" Shop Order Numbers to which it is possible to charge expenditures otherwise apparently unaccounted for on the chart. The account numbers under the "Miscellaneous" headings cover definite items on which costs are desired such as —"1,301, Repair to Underpass Pump" or "7,804, Repair to County Tunnel Lights."

3. There are no car or car series numbers on the chart. Costs are kept by parts and types of equipment and the various operations on the same.

A framed copy of the "Shop Order Number" chart is kept in each of the departments of the shop and the

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*The characteristics of the Oakland, Antioch & Eastern Railway's cars and equipment were described in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 11, 1913.

SHOP ORDER NUMBERS

PASSENGER CAR BODY

3001	couplers
3002	pilots
3003	doors
3004	seats
3005	glass
3006	gongs & signal bells
3007	sanders
3008	spring buffers
3009	safety chains
3010	main body work
3011	sash
3012	window guards
3013	grab handles
3014	running boards
3015	steps
3016	ventilators
3017	identification boxes
3018	water tanks
3019	car curtains
3020	roofs
3021	flooring
3022	toilets
7007	insp of safety appliances

OTHER BODY EQUIPMENT

6718	registers-repairs only
6719	cup vendors "
6720	foot stools "
6721	fire extinguishers "
6722	marker lamps "
6723	oil lamps "
6724	signal cases "
3023	emergency tool boxes "
3024	trolley catchers "
7008	genl insp car bodies

LIGHTING & WIRING

3025	headlights
3026	headlight wiring
3027	heaters & heater circuits
3028	lights & light circuits
3029	air wiring
3030	fan & fan wiring
3076	heat regulators

AIR BRAKES PASS. CARS

3031	hand brakes
3032	train stops
3033	" application valve
3034	air hose
3035	brake valves
3036	triple valves
3037	double check valves
3038	feed valves
3039	air piping
3040	governors
3041	double cut out cocks
3042	angle cocks
7003	inspection of air equip.

SIGNAL EQUIPMENT

3043	signal reducing valves
3044	signal valves
3045	signal whistle valves
3046	whistles

TRUCK REPAIRS PASS. CARS

3047	spring hangers
3048	brake rigging
3049	turning wheels
3050	changing wheels
3051	journal brasses
3052	changing brake shoes
3053	truck frames
3054	journal boxes
3055	bolsters
3056	springs
3057	equalizing bars
3058	axles
3073	Grinding Davis Wheels

DYNAMOTORS

3059	dynamotor wiring
3060	" brushholders
3061	" resistance

DYNAMOTORS Y.E 3

3062	changing armatures
3063	Rep. & rewind armatures
3064	changing fields
3065	Rep. & rewind fields

DYNAMOTOR C.D.M.13

3066	changing armatures
3067	rep & rewind armatures
3068	changing fields
3069	rep & rewind fields

COMPRESSORS D 2 L

3070	repairs to compressor

COMPRESSORS C.P.29

3071	repairs to compressor

MISCELLANEOUS

3072	car painting
7001	labor-car cleaning
6701	material- "
7002	labor-car oiling
6702	material- "
6703	lamps
6704	drinking cups
6705	toilet paper
6706	trolley rope
6707	register cord
6708	signal cord
6709	register rolls
6710	motor carbons.
6711	dynamotor carbons
6712	headlight carbons
6713	lamp chimneys
6714	oil for lamps & markers
6715	soda & acid for extingrs
6716	inspector's lanterns
6717	other miscel. supplies
6725	miscl. repairs body eqp

REPAIRS TO FREIGHT CARS

3101	ballast cars body
3102	box car body
3103	flat car body
3104	cabooses body
3105	trucks
3106	changing wheels
3107	turning wheels
3108	brake shoes
3109	journal brasses
3110	couplers
3111	brake rigging
3112	air hose
3113	hand brakes
3114	painting
3115	repairs to foreign cars
3116	insp freight equipm't
3117	cleaning & testing air
3118	Repacking & Oiling

SERVICE CARS

3201	brown hoists
3202	tower cars
3203	tenders
3204	steam shovels

COLLECTORS PASS. CARS

3301	pantographs
3302	trolley wheel
3303	trolley bases
3340	" poles

WIRING PASSENGER CARS

3304	main wiring
3305	control wiring

CONTROL EQUIP PASS. CARS

3306	controllers
3307	control resistance
3308	operating switch
3309	control coupler socket
3310	control jumper
3311	bussline jumper
3312	bussline receptacle
3313	electric brake
3075	Control Change Over

MAIN APPARATUS

3314	circuit breakers
3315	reversers
3316	resistance
3317	switch groups
3318	change over switch

MOTORS

3319	brush holders.
3320	motor leads
3321	armature bearings
3322	motor bearings
3323	gear cases
3324	pinions
3325	gears
3326	motor cases

MOTORS G.E. 205

3327	changing armatures
3328	rep & rewind armatures
3329	changing fields
3330	rep & rewind fields.

MOTORS WEST. 321

3331	changing armatures.
3332	rep & rewind armatures
3333	changing fields
3334	rep & rewind fields

MOTORS WEST. 322.

3335	changing armatures
3336	rep & rewind armatures
3337	changing fields
3338	rep & rewind fields

MISCELLANEOUS

3339	miscel's elect. repairs
7004	inspect. elect. equipm't

BODY LOCOMOTIVES

3401	couplers
3402	pilots
3403	doors
3404	glass
3405	gongs & signal bells
3406	sanders
3407	safety chains
3408	main body work
3409	identification boxes
3410	steps
3411	roofs
3412	floors

OTHER BODY EQUIPMENT

3413	emergency tool boxes

LIGHTING & WIRING

3414	headlights
3415	h'dl't wiring & resistance
3416	heaters & heater circuits
3417	lights & light circuits
3418	air wiring

AIR BRAKES LOCOMOTIVES

3419	hand brakes
3420	air piping
3421	air hose
3422	brake valves
3423	feed valves
3424	distributing valves
3425	governors
3426	angle cocks
7005	insp of air equipment

SIGNAL EQUIPMENT

3427	signal red. valves
3428	signal valves
3429	signal whistle valves
3430	whistles

TRUCK REPAIRS LOCO'S

3431	spring hangers
3432	brake rigging
3433	turning wheels
3434	changing wheels
3435	changing brake shoes
3436	journal brasses
3437	truck frames
3438	journal boxes
3439	bolsters
3440	springs
3441	equalizing bars

DYNAMOTOR LOCO'S

3442	dynamotor brush h'ld'rs
3443	" resistance
3444	" wiring

DYNAMOTORS Y.E 3

3445	changing armatures
3446	rep. & rewind armatures
3447	changing fields
3448	rep. & rewind fields

DYNAMOTORS Y.E.4.

3449	changing armatures
3450	rep & rewind armatures
3451	changing fields
3452	rep. & rewind. fields

DYNAMOTORS C.D.M.13

3453	changing armatures
3454	rep & rewind. armatures
3455	changing fields
3456	rep. & rewind fields

COMPRESSORS D.2 L.

3457	repair compressors

COMPRESSORS D.3.L

3458	repair compressors

COMPRESSORS C.P.29.

3459	repair compressors

MISCELLANEOUS

3460	painting locomotives

COLLECTORS LOCOMOTIVES

3461	pantographs
3462	trolley wheels & poles
3463	trolley bases

WIRING LOCOMOTIVES

3464	main wiring
3465	control wiring

CONTROL EQUIPMENT

3466	controllers
3467	control resistance
3468	operating switch
3469	control coupler socke.
3470	control jumpers
3471	buss-line receptacle
3472	buss-line jumpers

MAIN APPARATUS LOCO'S

3473	circuit breakers
3474	reversers
3475	resistance
3476	switch groups
3477	change over switch

MOTORS - LOCOMOTIVES

3478	brush holders
3479	motor leads
3480	armature bearings
3481	motor bearings
3482	gear cases
3483	motor cases
3484	gears
3485	pinions

MOTORS WEST. 321

3486	changing armatures
3487	rep. & rewind armatures
3488	changing fields
3489	rep & rewind fields

MOTORS 308 B.6

3490	changing armatures
3491	rep. & rewind. armatures
3492	changing fields
3493	rep. & rewind fields

MOTORS 308 D.7

3494	changing armatures
3495	rep & rewind armatures
3496	changing fields
3497	rep & rewind fields

MISCELLANEOUS

3498	miscel elect. repairs
7006	insp. of elect. equipm't

SUB-STATIONS

4801	sub-stations general
4802	repairs-tunnel sub-sta
4803	" Concord "
4804	" Drawbridge "
4805	" Dozier "
4806	" Lisbon "

CROSSING SIGNALS

1601	m'tce crossing signals
1602	repairs to
1603	" relays res & loco
1604	" other wiring
1605	" trolley contacts
1606	Painting Crossing Signals & Poles

AUTOMATIC SIGNALS

7208	m'tce block signals
1702	repairs to relays
1703	" relay wiring
1704	" other wiring
1705	" imp bonds & wiring
1706	" switch boxes
1707	" trans & H.T. fuses
1708	" signals-heads-poles etc
1709	" insulated joints
1710	painting poles & signals
2211	repairs to bonding
1512	bridge circuit controller

TELEPHONES

1801	m'tce telephone system
1802	repairs to instruments
1803	" line
1804	" submarine cable
1805	miscellaneous repairs

INTERLOCKING

7201	operation of tower
7202	m'tce interlocking plant
1720	rep. to relays & indicators
1721	" mech. wiring & switchboard
1722	" derails & switches
1723	" signals
1724	" interlocking machine
1725	" track circuits
1726	" air lines
1727	" compressor & motors
1728	" storage batter.
1729	" insulated joints
1730	painting signals & poles
2214	repairs to track bonding

SHOP EXPENSE

3601	shop tools & machinery
3702	cleaning shop
3703	lighting shop
3704	heating shop
3705	small hand tools
3706	other miscel. shop expense

AUTOMOBILES

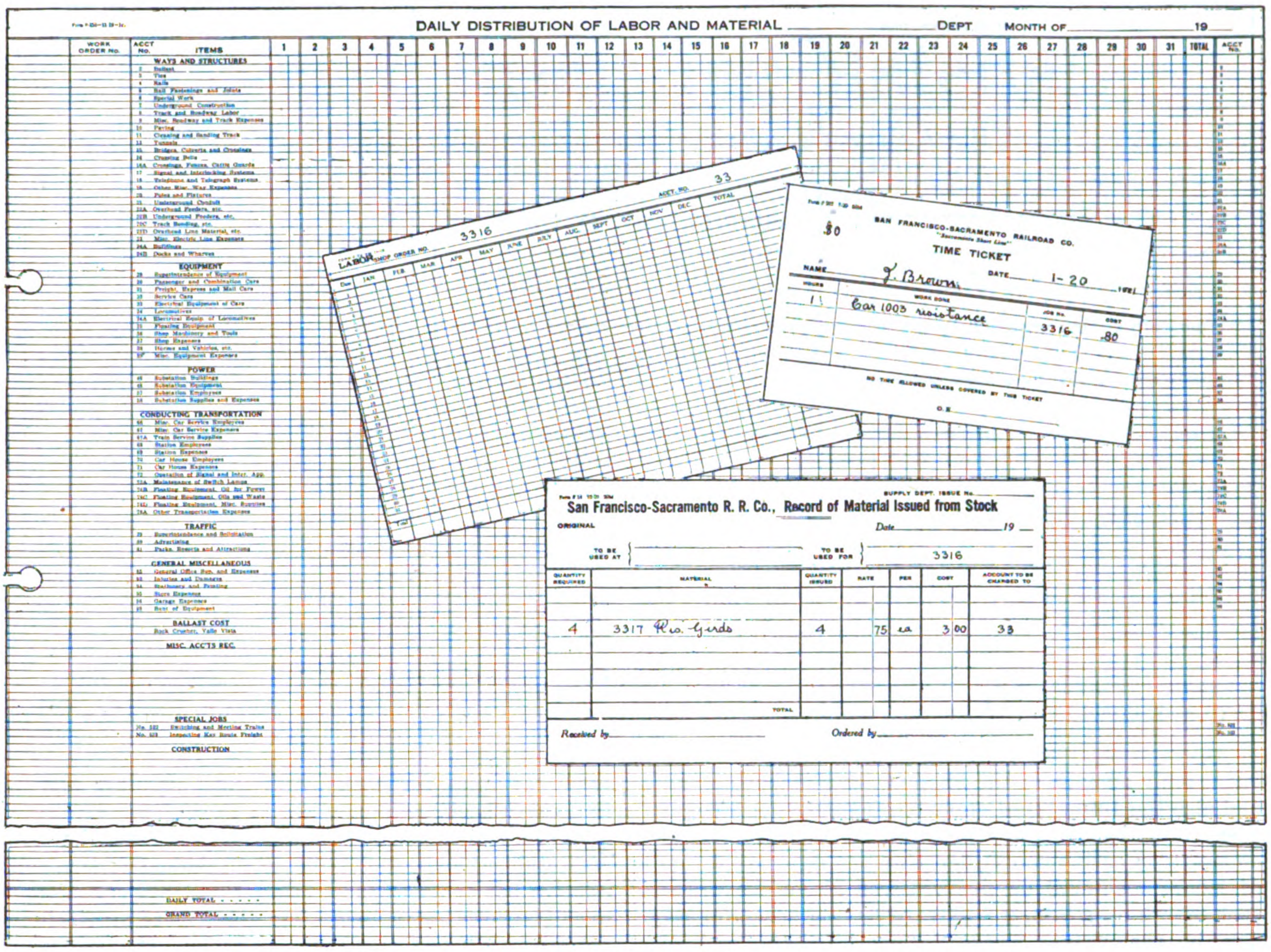
3801	repairs to automobiles
9601	gas, oil & etc for autos

MISCELLANEOUS

401	repairs-roadway tools
402	" track speeders-pushcars
2403	" ferry slips
3504	" ferry boat
7801	m'tce Shafter Ave. arcs
7802	repairs to " "
7803	" Sacramento " "
7804	" county tunnel lights
1301	" Underpass Pump

Revised 7-1920

E.D. 114



DAILY DISTRIBUTION OF LABOR AND MATERIAL ________ DEPT MONTH OF ________ 19___

WORK ORDER No. | ACCT No. | ITEMS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | TOTAL | ACCT No.

WAYS AND STRUCTURES
Ballast
Ties
Rails
Rail Fastenings and Joints
Special Work
Underground Construction
Track and Roadway Labor
Misc. Roadway and Track Expenses
Paving
Cleaning and Sanding Track
Tunnels
Bridges, Culverts and Crossings
Crossing Bells
Crossings, Fences, Cattle Guards
Signal and Interlocking Systems
Telephone and Telegraph Systems
Other Misc. Way Expenses
Poles and Fixtures
Underground Conduit
Overhead Feeders, etc.
Underground Feeders, etc.
Track Bonding, etc.
Overhead Line Material, etc.
Misc. Electric Line Expenses
Buildings
Docks and Wharves

EQUIPMENT
Superintendence of Equipment
Passenger and Combination Cars
Freight, Express and Mail Cars
Service Cars
Electrical Equipment of Cars
Locomotives
Electrical Equip. of Locomotives
Floating Equipment
Shop Machinery and Tools
Shop Expenses
Horses and Vehicles, etc.
Misc. Equipment Expenses

POWER
Substation Buildings
Substation Equipment
Substation Employees
Substation Supplies and Expenses

CONDUCTING TRANSPORTATION
Misc. Car Service Employees
Misc. Car Service Expenses
Train Service Supplies
Station Employees
Station Expenses
Car House Employees
Car House Expenses
Operation of Signal and Inter. App.
Maintenance of Switch Lamps
Floating Equipment, Oil for Power
Floating Equipment, Oils and Waste
Floating Equipment, Misc. Supplies
Other Transportation Expenses

TRAFFIC
Superintendence and Solicitation
Advertising
Parks, Resorts and Attractions

GENERAL MISCELLANEOUS
General Office Sup. and Expenses
Injuries and Damages
Stationery and Printing
Store Expenses
Garage Expenses
Rent of Equipment

BALLAST COST
Rock Crusher, Valle Vista

MISC. ACC'TS REC.

SPECIAL JOBS
Switching and Meeting Trains
Inspecting Key Route Freight

CONSTRUCTION

DAILY TOTAL
GRAND TOTAL

LABOR SHOP ORDER NO. 3316 ACCT. NO. 33

Day | JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC | TOTAL

SAN FRANCISCO-SACRAMENTO RAILROAD CO.
"Sacramento Short Line"
TIME TICKET

.80

NAME J. Brown DATE 1-20 1921

HOURS	WORK DONE	JOB No.	COST
1	Car 1003 resistance	3316	.80

NO TIME ALLOWED UNLESS COVERED BY THIS TICKET

O.K. ________

SUPPLY DEPT. ISSUE No. ________
San Francisco-Sacramento R. R. Co., Record of Material Issued from Stock
ORIGINAL
Date ________ 19___
TO BE USED AT ________ TO BE USED FOR 3316

QUANTITY REQUIRED	MATERIAL	QUANTITY ISSUED	RATE	PER	COST	ACCOUNT TO BE CHARGED TO
4	3317 Res. Girds	4	75	ea	3 00	33
	TOTAL					

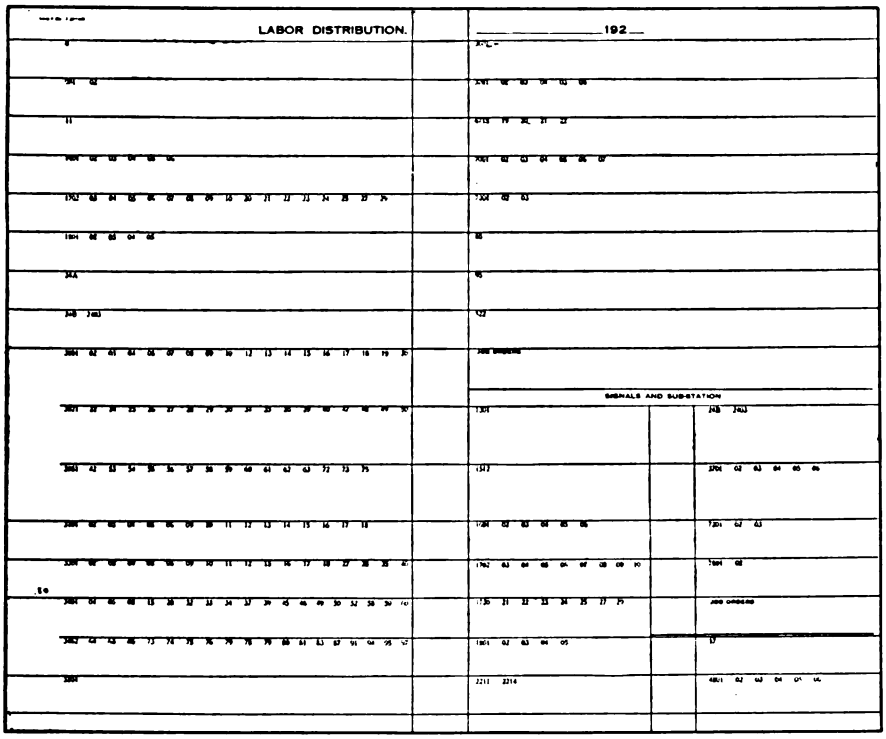
Received by ________ Ordered by ________

LARGE FORM, BASIS FOR SEGREGATION OF ALL LABOR AND MATERIAL CHARGES. INSERT, AT LEFT, LABOR DISTRIBUTION FORM MADE UP FROM TIME SLIPS. AT RIGHT, TIME SLIP USED BY SHOPMEN. BOTTOM, MATERIAL RECORD CORRESPONDING TO TIME SLIP

foremen handling work are held responsible to see that the men in making out their time slips are charging the correct shop order number. In another illustration is displayed the form of time slip used. Such slips are made out and turned in daily to the foremen, who approve and forward them to the mechanical department office not later than 10 o'clock the following morning. The slips are then extended by the clerk according to the men's rates, not less than one hour being charged to any Shop Order Number, and the amounts are distributed on the daily "Labor Distribution" form shown on this page. This develops the total amount

TABLE I—MAINTENANCE OF PASSENGER EQUIPMENT, 1920, SAN FRANCISCO-SACRAMENTO RAILROAD

Item	Labor	Material	Total	Per Cent of Sub-Total	
Control Equipment (Details)					
Controllers (master)	$81.14	$53.00	$134.14	14.7	
Control resistance	22.57	15.50	38.07	4.2	
Operating switches	2.04	.85	2.89	0.3	
Control coupler sockets	24.31	12.25	36.56	4.0	
Control jumper	87.05	60.49	147.54	16.2	
Busline jumper	133.87	264.37	398.24	42.8	
Busline receptacle	78.58	40.28	118.86	13.1	
Electric brakes	2.91	0.09	3.00	0.3	
Control changeover	18.23	16.13	34.36	3.8	
Total	$450.70	$462.96	$913.66		
Per car-mile					$0.00057
Control Equipment (Main apparatus)					
Circuit breakers	19.89	19.69	39.58	1.6	
Reversers	159.32	145.01	304.33	12.1	
Resistance	182.27	443.45	625.72	25.0	
Switch groups	787.48	506.47	1,293.95	51.7	
Changeover switches	144.99	74.06	219.05	9.0	
Total	$1,293.95	$1,188.68	$2,482.63		
Per car-mile					$0.00155
Collectors					
Pantographs	856.90	201.99	1,058.89	33.6	
Trolley wheels	504.86	974.52	1,479.38	47.1	
Trolley bases	37.15	58.56	95.71	3.0	
Trolley poles	358.18	249.96	508.14	16.3	
Total	$1,657.09	$1,485.03	$3,142.12		
Per car-mile					$0.00196
Motor (Details)					
Brushholders	$145.06	$145.57	$290.63	7.8	
Motor leads	103.30	238.97	342.27	9.2	
Armature bearings	78.36	454.49	432.85	14.4	
Motor bearings	173.30	753.97	927.27	25.0	
Gear cases	33.26	13.43	46.69	1.3	
Pinions	24.71	495.56	520.27	14.1	
Gears	108.86	765.28	874.14	23.6	
Motor cases	48.50	104.73	153.23	4.1	
Total	$715.35	$2,972.00	$3,687.35		
Per car-mile					$0.0023
Wiring					
Main wiring	108.63	161.79	270.42	51.8	
Control wiring	157.81	93.20	251.01	48.2	
Total	266.44	254.99	521.43		
Per car-mile					$0.0003
Motors West 322					
Changing armatures	329.73	.63	330.36	18.2	
Repairing and rewinding armatures	333.75	770.43	1,104.18	60.8	
Changing fields	77.36	50.70	128.06	7.0	
Repairing and rewinding fields	197.30	52.34	249.62	14.0	
Total	$938.14	$874.10	$1,812.24		
Per car-mile					$0.00113
Grand total	$5,321.67	$7,237.76	$12,559.43		
Per car-mile					$0.00778



LABOR DISTRIBUTION.

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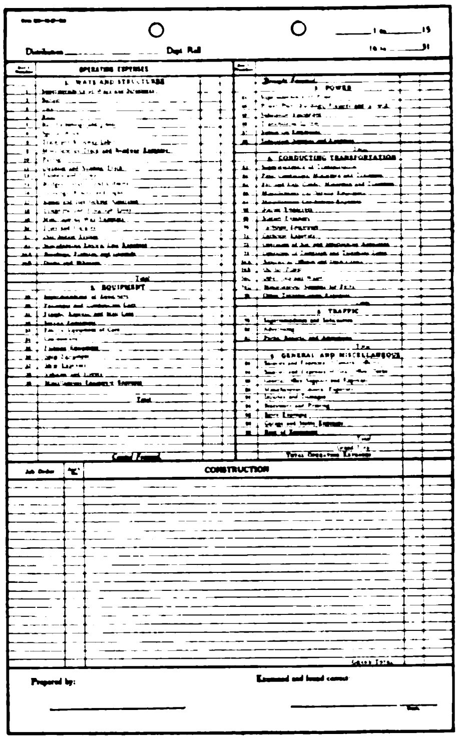
SIGNALS AND SUB-STATION



CONSTRUCTION

Prepared by:

AT LEFT, FORM USED TO RECORD LABOR EXPENSE CHARGEABLE TO I. C. C. ACCOUNTS. AT RIGHT, ALL AMOUNTS FOR LABOR ON INDIVIDUAL SHOP ORDER RECORDED ON THIS CARD

spent daily on each of the Shop Order Number accounts and also the Interstate Commerce Commission accounts. These must balance daily with the payroll amount. The amount for each Shop Order Number daily on account of labor is entered up progressively from the first of each month on a 5-in. x 8-in. card having space for each day in the year. There is one "Labor" and one "Material" card for each Shop Order Number of the form shown as an insert on page 717. The material card record is handled the same way through the entering up of the storeroom requisitions, charged to the proper Shop Order Number daily. From these cards progressive records are available of the amounts spent on each account for either labor or material. From the daily labor distribution sheet, which is filed with the time cards after the payroll has been made out, the amounts of labor expense chargeable daily to the Interstate Commerce Commission accounts are entered up on another form, shown at the top of this page. This is carried forward to the end of the month progressively so that the total figure charged to each account appears on the last day of the month. The purchasing and stores department handles the material account in the same way. At the end of the month the form shown on page 717, giving distribution of mechanical and power department payroll by the Interstate Commerce Commission accounts, is filled in and forwarded to the auditor.

Throughout the year special items such as trolley wheels, brake shoes, lubrication, wheels, etc., are taken from the Shop Order Number cards and the cost per 1,000 car-miles for each month computed for plotting in a curve book.

At the end of the year all of the data from the cards are totalized and tabulated into an annual report, with relative per cents of the total and cost per car-mile for the fifty-three main items. In the report are included the operating record of the equipment, changes made, extraordinary worth, etc., as well as the detailed cause of all delays.

The cost of maintaining electrical equipment on passenger cars for the year 1920 is given in Table I. This represents two pages out of the forty-two-page report and will serve to illustrate the methods of keeping and tabulating the various costs.

In Table II will be found rolling equipment performance data for the years 1915 to 1920 inclusive, also electrical equipment maintenance costs for the same period of time. The latter shows the effect of war-time wages and material during the past three years on delays to service and cost per 1,000 car-miles.

This system gives very complete data and is applicable to any electric railway or electrification where accurate detailed costs are desired. It serves as a check on the cost of maintenance and alleviates numerous troubles by indicating the cause, thus permitting a slight change in equipment or operating conditions. The writer has attempted merely to outline the method that has been used very successfully by F. A. Miller, superintendent of power and equipment of the San Francisco-Sacramento Railroad.

Table II—ROLLING EQUIPMENT PERFORMANCE DATA

Year	1915	1916	1917	1918	1919	1920
Passenger Equipment						
Total mileage including trailers	1,562,264	1,435,183	1,569,075	1,429,346	1,556,932	1,616,316
Total number delays—all causes	37	35	37	43	25	26
Total minutes delay	806	736	1,118	1,625	562	668
Average length delay minutes	21.7	21	30.2	37.8	22.4	25.7
Car-miles per delay	42,223.3	41,005.2	42,677.0	33,240.0	2,277.0	62,166.0
Number delays per 1,000 car-miles	0.023	0.024	0.0234	0.03009	0.016	0.0163
Minutes delay per 1,000 car-miles	0.516	0.513	0.707	1.1371	0.361	0.4182
Electrical maintenance cost per 1,000 car-miles	$3.13	$5.35	$4.45	$8.07	$6.37	$7.78

Electrical Insulating Materials[*]

The Most Essential Characteristics of Insulating Materials Are High Dielectric Strength and Ohmic Resistance, but Ability to Withstand Considerable Mechanical Stress and Heat Is Also Desirable

BY NORMAN LITCHFIELD

THE old analogy of electricity to water under pressure, flowing through a pipe, while not scientifically accurate, has served well to give a general idea of some electrical functions and properties, and may equally well be used to show the relation between electric current, the conductor and the insulator, the first being analogous to the fluid, the second to the bore of the pipe and the third to the walls of the pipe. It is with the last named that we are concerned in this article, and an attempt will be made to sketch the nature and properties of some insulating materials which are in general use in the electric railway field. The insulator, like the pipe walls in the conduction of water, must prevent the electricity from bursting violently through so that it is all lost, before arriving at its proper destination, and it must not permit small quantities to ooze through, thus losing in the aggregate a considerable amount. If the former occurs, we have what is designated a "short" circuit, because the electricity has taken a short path back to the source of supply, without traversing the long path through the working machine as intended.

Furthermore the insulating materials must continue to fulfill these functions over reasonably long periods, despite the adverse and deteriorating conditions to which it is naturally subjected in its place of use.

The ability of the material to resist the tendency of the electricity to burst through is known as the dielectric strength; that preventing leakage is the ohmic resistance.

Again, just as water is conducted through pipes of iron, wood, stone, concrete, glass, brass, copper, rubber, etc., depending on some particular mechanical quality of the conducting substance, so it has been found by long and costly experimentation that certain insulating materials possess particular electrical, mechanical and other qualities which render them more suitable for use under some specific set of circumstances than others. The chief of these characteristics are the following: (1) Dielectric strength, (2) ohmic resistance, (3) tensile strength, (4) resistance to abrasion, (5) flexibility, (6) stability under heat, (7) stability under moisture, (8) stability under vibration, (9) ability to be molded into a given shape, (10) ability to take high surface polish, (11) ability to withstand climatic conditions, (12) fireproof qualities, (13) resistance to electric arc, (14) cost.

For general use rubber has proved to be the material most generally adaptable. In fact, rubber may be said to go hand in hand, as it were, with copper in differentiating the electrical industry from other industries. Copper's influence was already mentioned by the writer in a recent article in the ELECTRIC RAILWAY JOURNAL on the nature and uses of that metal. Copper as a conductor and rubber as an insulator, together with iron as the magnetic material, form the material backbone of the electrical industry. It is interesting to note that the name "rubber" as applied to caoutchouc is a purely colloquial one, the origin being the suggestion of the English chemist Priestly, toward the end of the eighteenth century, that caoutchouc was useful for "rubbing out" pencil marks. It was immediately used for this purpose and became known as "India rubber."

SOFT RUBBER INSULATION FOR WIRES AND CABLES

The basic material of the rubber insulation used in cables, etc., is India rubber, or caoutchouc. This is the milky juice which oozes out and then coagulates when the skin of the plant is punctured. The grade of the rubber varies with the plant and with locality, the highest grade coming from Para, in Brazil, produced by plants of several kinds of that class known to botany as Hevea. This grade is therefore sometimes called Hevea rubber, but its usual designation is Para rubber. It is of course not always necessary to use the highest grade of rubber, but practically all specifications for insulation require a certain percentage of "pure Para rubber."

Rubber in its natural state, as it comes from the plant, becomes hard and stiff when cold, and it is therefore unfit for most commercial purposes in its untreated condition. One of the great epoch-making discoveries in this field was that by Charles Goodyear, in 1844, of the process known as "vulcanizing" rubber. In this process the rubber is mixed with sulphur in a light powdery state (flowers of sulphur) at low heat, and is then "cured" in superheated steam at about 300 deg. Fahr. The whitish natural rubber by this process becomes gray and hornlike, and in this state is but little affected by cold. By variation in the amount of the sulphur and the degree of heat, various different graduations of hardness are obtained up to the hard grade known as hard rubber, vulcanite or ebonite, the varying shades of color being the result of additions of mineral matter and old rubber.

Rubber insulation, even in the best grades, contains but little more than 30 per cent of new rubber. Thus the tentative specifications of the American Society for Testing Materials for insulated wire permit, in addition to new Hevea rubber, "waxy hydrocarbons consisting of ceresin or refined paraffin, sufficient sulphur properly to vulcanize any inorganic mineral matter," the rubber content being from a minimum of 30 per cent to a maximum of 33 per cent.

The amount of rubber in the insulation practically determines its price, 30 per cent and up being the highest commercial grade. Lower percentages are often used, however, it being quite common on car equipment to use 20 or 25 per cent. The equipment committee of the American Electric Railway Engineering Association in 1915 put itself on record as follows: "There can be no question but that 30 per cent pure Para rubber would give the best results, and its use may be advisable in special cases, as where cars are operated in subways, and there is a liability to small short circuits which might cause smoke, fire or a possible panic. However, the wire referred to by manufacturers as containing 20 per cent pure Para rubber is giving general satisfaction and it is felt that 30 per cent makes an insulation probably more expensive than is necessary. Especially does this seem to be the case in view of the fact that car wiring is often removed after a few years, in which event if 30 per cent compound were used the benefit of longer service for the extra expense would not be obtained." The committee then calls attention to the specification for rubber-insulated wire for power distribution purposes given in section Dw8a of the Engineering Manual of the Engineering Association, and gives as its opinion that the specification covers a quality of insulation satisfactory for car equipment purposes.

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[*] This is the last of a series of seven articles prepared by Mr. Litchfield to bring about better co-operation between users and makers of electric railway equipment. The previous articles appeared in issues of this paper for Feb. 21, 1920, page 366; April 17, 1920; page 803; June 19, 1920, page 1247; July 17, 1920, page 115; November 20, 1920, page 1051, and December 18, 1920, page 1229.

Since the publishing of the above opinion the power distribution committee has revised its specification to Dw8b, which "is the result of a demand for low grades of wire and cable, insulated with Para rubber compound, that can be used for line and equipment purposes," the 30 per cent compound being entitled "Grade A" and the 20 per cent "Grade B." For Grade A, the composition required is the same as that already quoted from the A. S. T. M. tentative specifications, namely, rubber, sulphur, inorganic mineral matter and refined solid paraffin or ceresin.

Both the A. E. R. E. A. Grade A and the A. S. T. M. specifications are the result of the work of the joint rubber insulation committee, a full report of whose work is given in the 1914 Proceedings of the American Institute of Electrical Engineers, which not only laid down the desired composition but also the exact method of analysis, as it was found that with different methods quite widely varying results were obtained from the same material. This method is given in detail in the A. S. T. M. and A. I. E. E. publications, and as it is not of general interest to the user of the insulation will not be quoted further. It may simply be stated that the method finally adopted was that which all agreed would show whether pure Para rubber had been used, and in what amount.

For the Grade B insulation the A. E. R. E. A. specification does not require pure Para rubber, but simply that the insulation shall contain not less than 27 per cent of rubber gum. Five chemical tests are prescribed, namely, acetone extract, alcoholic potash extract, chloroform extract, ash and total sulphur. It is required that the sum total of the results of these five tests shall not exceed 73 per cent by weight of the total compound, the tests to be made in accordance with the Underwriters' Laboratory specification. Obviously the specification for the Grade B material is much less exacting than that for the Grade A.

In passing it may be said that the making of rubber analysis is a difficult matter, requiring the services of an expert chemist. It is, therefore, somewhat expensive and for this reason a chemical analysis is not always resorted to by the user.

For physical properties the A. S. T. M. specification requires the following: Tensile strength, minimum, 1,000 lb. per square inch; set, maximum in 2 in., $\frac{3}{8}$ in.; elongation, minimum before rupture, 2 to 9 in.; test specimen to be 2 in. long between bench marks, and to be stretched at the rate of 20 in. per minute until the specimen breaks.

For testing the set, another 2-in. specimen is stretched at the rate of 20 in. per minute until the bench marks are 6 in. apart, and released within another five seconds. The set is determined one minute after the beginning of release. The elongation test is made on the same specimen used for the set test, and after the completion of the latter. It is stretched at the rate of 20 in. per minute until it breaks.

The physical requirements of the A. S. T. M. specification as given above, are somewhat different from those of the A. E. R. E. A. in its specification Dw8b already referred to, which requires as follows: Tensile strength, minimum, 1,000 lb. per square inch; elongation at break, five times original length, or four times original length if specimen is over $\frac{12}{64}$ in. thick; elongation five seconds after release when stretched at rate of 12 in. per minute to three times its original length, 20 per cent.

For convenience we may set the equivalent values one against the other, as follows:

	A. S. T. M.	A. E. R. E. A
Original length..............	2 in.	2 in.
Tensile strength.............	1000 lb. per sq. in.	1000 lb. per sq. in.
Rate of stretch for tensile test	20 in. per min.	12 in. per min.
Elongation measured on.....	"set" specimen re-stretched after set test to rupture	"tensile" specimen at rupture
Elongation (times original length)..................	....	5, or 4 if specimen is over 12/64 in. thick
Elongation.................	2 to 9 in.	....
Set in per cent of original length	18¾	20
Set in inches...............	$\frac{3}{8}$ in.	2/5 in.

It therefore appears that the two sets of requirements are very nearly alike, and it would seem that in the interest of standardization the two specifications should be brought to agree, inasmuch as either one probably insures the desired qualities.

With regard to electrical properties the chief, in addition to chemical and physical features already outlined, are, first, dielectric strength, which is the property of resisting the puncturing of insulation by high voltages, and second, ohmic resistance, which is the property of resistance leakage.

Both of these tests are made after immersion in water for a given period and while the specimen is still submerged. Of the two, the breakdown or dielectric strength test is the more important. It is usually made on the basis of twice the normal voltage plus 1,000 volts. Detailed figures are given in both the specifications already referred to.

It may not be amiss to point out that the purpose of the foregoing tests and requirements is to provide a material that will (1) stand high voltages without puncturing, (2) prevent leakage, (3) bend without cracking, (4) not become hard or otherwise deteriorate with reasonable age, (5) not absorb moisture and (6) withstand reasonable temperatures.

Reference to fireproofing has been omitted for the reason that the application of a fireproof covering has generally the effect of giving a tendency to absorb moisture, thus causing liability to short circuit and thereby to starting fires where no fire existed. Fireproof insulated wire is made and is used successfully in places where the temperature is so high that the ordinary insulation will not stand up. It cannot be exposed directly to moisture.

Much more could be said in relation to methods of manufacture, braid coverings, cotton separators, etc., but these subjects are hardly germane to the purpose of this article, which is simply to give an outline of the nature of the common insulating materials. Emphasis should nevertheless be laid (as the writer has done in connection with other materials) on the skill and integrity of the manufacturer, without which no specification is effective.

COTTON AND PAPER INSULATION FOR WIRES AND CABLES

Small wires, such as are used in small armature and other coils, are quite generally insulated with cotton, either wound on the wire in the form of thread or in woven tubular form. Cotton insulation needs no special comment other than that it is used only where the differences in potential are small. It is often impregnated with some insulating varnish, the nature of which will be discussed later.

For lead-sheathed cable for power distribution purposes the insulation is composed chiefly of paper. A good description is given in the A. E. R. E. A. standard specifications for three-conductor cable, an extract from which follows:

> The cable is to be composed of three copper conductors, each separately covered with paper tape to the required thickness and then twisted together with a suitable lay. The interstices are to be rounded out with jute and the whole wrapped with a paper belt to the required thickness.
>
> The paper, soaked in a suitable insulating compound, is to be covered with a lead sheath of the required thickness. The highest grade of pure manila rope paper tape shall be applied helically and evenly to each of the conductors until the required thickness of paper is obtained.
>
> All moisture shall be expelled from the paper and jute by baking in suitable ovens; they shall then be thoroughly saturated with the insulating compound of the required kind and quality.

This arrangement makes a tough, resistant insulation which bends the conductors tightly, keeping them from shifting and wearing into the insulation.

LINEN AND SILK USED WHERE MECHANICAL STRENGTH IS NECESSARY

Linen and silk are generally used as cloth, treated with linseed oil or some insulating compound. Being of a finer texture and greater mechanical strength than cotton, they are used in places where these qualities warrant the extra expense.

Glass and porcelain are excellent insulators, but have only a limited field on account of lack of mechanical strength. Both are used extensively for line insulators, porcelain being preferable. The latter is also used for commutator brush supports and cores for heater coils. Its chief requisite is that it shall maintain an unbroken surface, as when the glaze becomes cracked dust and dirt and moisture soon accumulate and the insulator breaks down.

Wood, though a fairly good insulator when dry, absorbs moisture readily, and unless used in large masses must be painted or impregnated with some protecting paint or varnish. Familiar uses are line poles, crossarms, pins, trolley stand boards, contact shoe beams, etc.

The use of mica as the separator between the bars of commutators is familiar to all. It is universally employed for this purpose. Chemically it is a crystalline salt of aluminum and potassium or sodium. The crystals easily split up into thin sheets. Its color varies from white to amber, the latter being the softer grade.

Besides being used in its natural state, it is often used in composition with other materials. Thus "mica plate" is made up of small pieces of mica and paper treated with a special binding material and steamed under pressure. Other compounds of mica are micanite, micarta, etc.

The chief uses of mica and its compounds are in places where the temperature is apt to reach a point where other materials would not stand up or where a high degree of insulation must be maintained in very small thicknesses. While the white mica is the better insulator, the amber mica is the softer and is therefore used on commutators which are not slotted and in which the mica must wear down as quickly or more rapidly than the copper itself.

Asbestos, found chiefly in Canada, consists mainly of silicate of magnesia, fibrous in its nature, and capable of being woven if combined with cotton or other material, the fiber of the asbestos being too short to give the necessary strength alone. Its dielectric strength is not great and its chief use as an insulator comes in places where a high temperature or arcing occurs. It is familiar to all in the form of tape, cloth, paper, wallboard and "lumber" or "shingle," the latter being compounds of asbestos and portland cement.

Shellac, which is used as a binder, is a peculiar form of resin, the name being in reality a combination of the two words, shell and lac; that is to say, shellac is a shell-like form of lac. Lac is formed by an insect or parasite that lives on a tropical tree. The female sucks the juice from the tree, digests it and exudes it over herself, finally incrusting herself entirely with it, and lays her eggs in this envelope. In true India fashion she dies therein and her progeny eat her carcass and break their way out through the lac envelope. The twigs of the tree are covered with these envelopes and in this form are known as stick-lac. The lac is rubbed off the twigs and washed in water and in this form is called seed lac. These seeds are placed in cotton bags before a fire and the bags squeezed, the lac dripping out in much the same fashion that the housewife strains fruit juice for jellies. The lac drops on rollers or sticks to which it adheres in a thin shell, hence the name of "shell-lac."

MOLDED INSULATION HAS MANY FORMS

Molded materials derive their names from the fact that they are formed in molds and generally under pressure. They thus can be given practically any form, often with a high surface finish and of accurate dimensions. In many cases the molding process also permits the inclusion of brass inserts which are locked in by the compound around them and which can be tapped for screws, etc. They consist of mixtures, sometimes chemical compounds, of some of the materials already mentioned, rubber, asbestos, mica, fiber, shellac gums, asphaltic compounds and the so-called "synthetic resins." They are composed essentially of a filler and a binder, either of which may be the actual insulator, the other being included to give the desired form and mechanical properties.

Practically all are "trade compounds," the exact nature of which is kept more or less secret, but it is possible to give the reader a general idea of some of the better known materials. Those who are more particularly interested in the detailed chemical analysis will find several books and technical articles in the chemical press, to which they are referred.

The question is sometimes asked as to which is the best insulator among the molded materials, and in answer it may be generally said that that depends on the service to which it is to be put. Sometimes the need for great dielectric strength is paramount, at other times the electric stresses are not excessive, but the part must withstand considerable mechanical stress. At still other times heat is the controlling feature, or moisture may be the determining factor. Various compounds have been developed to meet these particular conditions, it being more or less true that one form of excellence is usually obtained at the expense of other points.

Thus, according to one authority, "compounds using the various grades of shellac as a binder are as a rule of low heat-resisting qualities, and owing to the nature of the filling materials, such as fiber and ground mica, will not take a practically high finish. These same fillers, however, impart to the stock relatively high mechanical and dielectric strength."

On the other hand some of those compounds using rubber as a binder "have relatively low mechanical strength of one sort, but have great strength of another sort, in that they successfully withstand blows and sudden shocks, being slightly elastic; that is to say, not at all brittle. On the other hand, they will not readily take inserts, such as screws and small metal parts. Their flexibility, however, permits them to be readily molded into large heavy shapes, and they are particularly adaptable, owing to their high resisting qualities for such parts as grid resistance frame bolts, fingerboards, division plates, arc chutes, coil and switch boxes. The flexibility also permits this class of material to be used for parts that are bolted or clamped to uneven surfaces of any kind, as, for instance, busbar installations.

In mechanical strength the synthetic resins, such as "Bakelite," stand alone among the molded compounds. Furthermore, they do not absorb moisture and they resist the action of nearly all acids and alkalis and can be used in the presence of oil.

In determining the relative value of the various materials four chief tests are made in the laboratory. The first of these is the dielectric strength test, in which it is customary to immerse the piece in oil, to decrease the surface leakage by increasing the dielectric surrounding the test piece. This permits the piece to be punctured before it arcs over. When the piece is punctured its thickness is measured in thousandths of an inch and the dielectric strength is calculated in volts per mil.

The second test is that for mechanical strength. The tensile strength is determined on a flat piece ½ in. thick and of shape approximating the figure 8, with the use of special clamps in an ordinary tensile test machine. The compressive strength is obtained on a specimen molded in the form of a cube in a hardened steel mold, 1 in. on edge. The transverse strength is determined on a ½-in. square specimen, 5 in. long. The maximum fiber stress is calculated by the formula $\frac{S = 3PL}{2BD^2}$ in which S = maximum fiber stress, P = load applied, L = distance between supports, B = width of specimen and D = depth of specimen.

The third test is that of distortion under heat, in which a test specimen is used for the same size and shape as that used in the transverse test. A special apparatus is used in which the specimen is supported on two steel supports, with a load applied on top of the specimen vertically and midway between the supports. The vessel in which the specimen is placed on these supports is surrounded with oil in another outside vessel. Arrangements are made for raising the temperature of the oil gradually. The machine is so arranged that the deflection of the specimen at the center can be measured on a scale, and is equipped with a thermometer so that the temperature of the specimen can be recorded at any time.

The fourth test is that of the effect of moisture, in which the original weight of the specimen is obtained, the dry weight after heating in an oven for a specified time and the saturated weight after immersion in water for 100 hours. Record is also taken of the percentage of moisture in the specimen as received, and the percentage of moisture absorbed during 100 hours, taking the dry weight as 100 per cent.

In the tensile and compressive test specimens are tested under three different conditions, namely, (1) In condition in which they are received, (2) after heating in an oven for one hour at a temperature 10 deg. C. below the distortion point of the material, as determined by the distortion test, and (3) after being entirely immersed in distilled water for forty-eight hours at normal room temperature.

In the transverse test specimens are tested as received, and also after immersion. Dielectric tests are made of specimens as received, after heating in oven and after having the rim immersed in melted paraffin for a depth of 1 in. and been entirely immersed in distilled water.

Further details of the tests will be found in "Tentative Tests for Insulating Materials," published by the American Society for Testing Materials, and from which the above was taken.

MOLDED MICA, ETC., USED FOR OUTDOOR WORK

The mica compounds use shellac as a binder, and often contain a certain amount of asbestos, which by virtue of its fibrous character gives the composition a mechanical strength which the mica alone does not possess. All of the materials being weatherproof, this composition lends itself to outdoor work.

The word "Vulcabeston," while a trade name, has been in use so long as practically to represent compounds of asbestos and rubber which are vulcanized.

"Bakelite" is the name given by Dr. Bakeland, the inventor, to a material made by his patented formula. It is essentially a product of the modern chemist, it being what is known as a synthetic resin; that is to say, a resin not found in nature, but one put together from certain definite materials according to a special process. The chemist tells us that it is a compound of formaldehyde and phenol, which admittedly does not convey much information to any one but a chemist. Suffice it to say that they are both organic compounds (not mineral) and are constituents of coal tar, that marvelous substance which results from heating coal with insufficient air and from which have sprung the extraordinary series of aniline dyes, perfumes, medicines, high explosives, etc., with which the modern chemist has astonished the world. These two compounds when properly treated combine to form the remarkable transparent substance "Bakelite," with which we have all become familiar in the form of pipe stems, fountain pens and toilet articles. In molded insulations it is used as a binder with wood or asbestos as a filler and is colored with various dyes.

PHYSICAL AND ELECTRICAL PROPERTIES

According to the authority already quoted, the dielectric strength and other properties of various compositions are as follows:

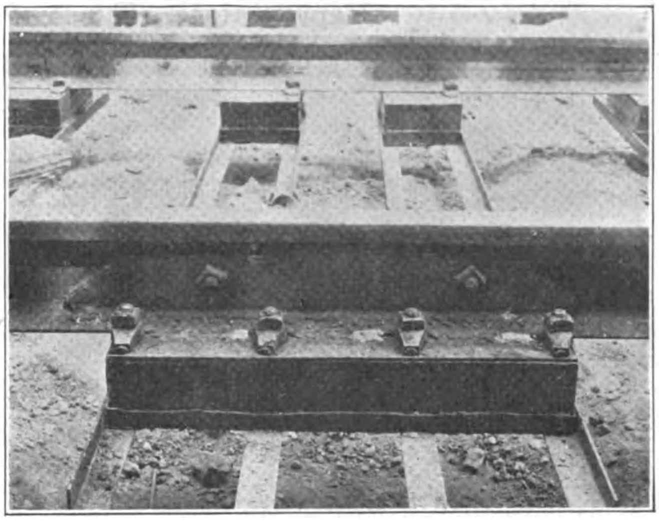
	Dielectric Strength, Volts per Mil	Transverse Strength Lb. per Sq.In. Cross-section	Heat Test, Deg. F.	Absorption After 48 Hours in Cold Water, per Cent
Shellac—mica compounds...	300–330	7,000–11,000	120–185	0.2–5.0
Asbestos—rubber compounds	90–180	3,600– 9,000	300–500	1.5–0.6
Bakelite compounds........	230–300	13,000	225–300	0.6–0.1

No attempt has been made in this article to cover all the materials for insulating purposes or to give more than a bare outline of some of the more salient characteristics thereof. But the subject is one which has received but little attention in the electric railway press, and this article may therefore serve to throw some light on these very interesting materials.

Resilient Track Laid in Wausau

Company Operating in Small Wisconsin City Free from Paving Burden—Constructs Track Ahead of Paving Work Which Is Done by the City

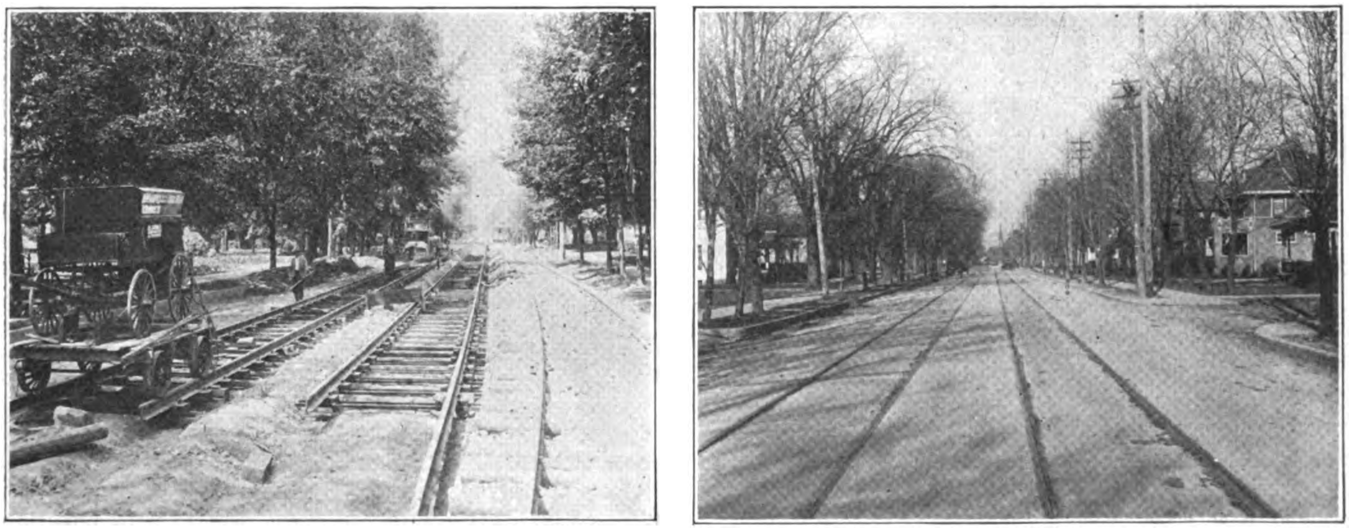
THE Wisconsin Valley Electric Company, which operates the local street railway system in Wausau, Wis., built 1 mile of double track last year, making use of a monolithic concrete paving and substructure construction and Dayton mechanical ties. As the company was relieved from doing any paving on streets occupied by car tracks, the pouring of the concrete paving in the trackway as well as at the sides of the streets was done by the city. The street railway company therefore assembled the ties and rails, welded the joints and brought the track to grade and alignment ahead of the paving work, and then had the city pour the concrete for the substructure as well as for the paving in the trackway. The concrete pavement was made 8 in. thick outside the car track, while the thickness of concrete in the trackway ran to 15 in. The company then simply reimbursed the city for the additional 7 in. of concrete placed in the track foundation. While the track construction was going on, the old track was thrown over to one side of the street and operation continued, as shown in one of the accompanying pictures.


CLOSE-UP VIEW OF JOINT CONSTRUCTION SHOWING APEX WELDING AND RESILIENT MECHANICAL JOINT TIE

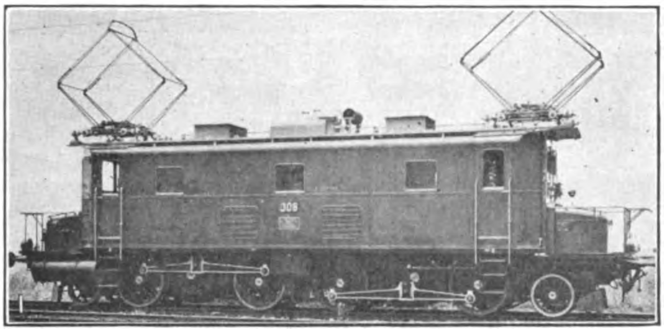
The type of construction used, employing T-rail, with the "Apex" welded joints of the Indianapolis Switch & Frog Company and the patented ties and special joint ties of the Dayton Mechanical Tie Company, are shown in the accompanying pictures. In speaking of the results obtained with this type of construction, N. C. Rasmussen, superintendent, made this comment:

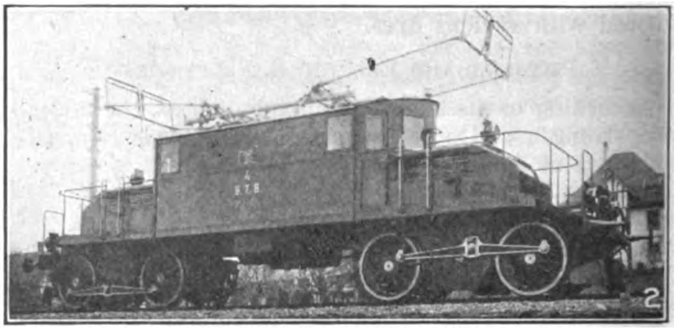
"It is of course too early to say how this track is going to stand up under traffic, as it has not been in service long enough, but from the indications thus far it is all right. It rides smoothly and quietly and we believe it is the coming thing in track construction."

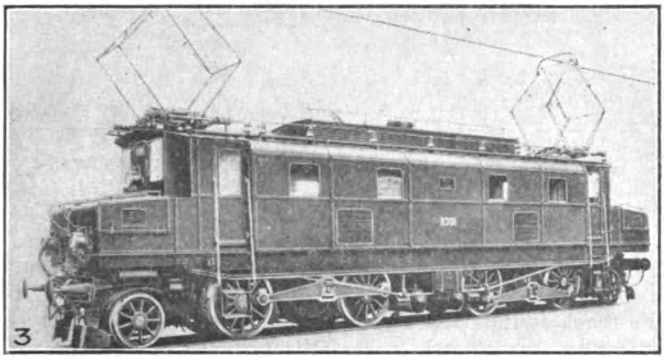
In the accompanying picture showing the completed track construction it will be noted that the concrete paving has been crowned between the rails to make the flangeways. The black jagged appearance along the flangeways is sand and refuse and not chipped concrete, as one might be led to believe.

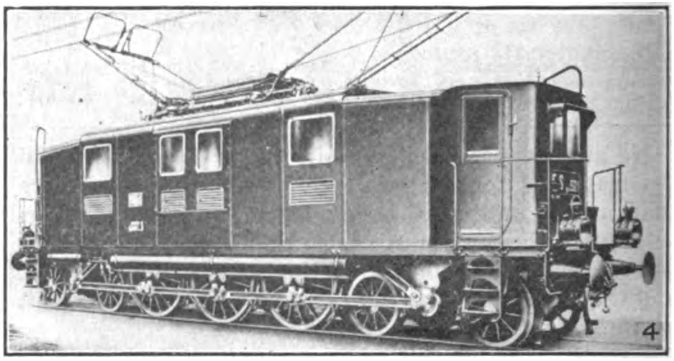

AT LEFT, TRACK CONSTRUCTION BLOCKED UP TO GRADE, SHOWING MECHANICAL TIES IN PLACE READY FOR POURING CONCRETE BASE AND PAVING, AND, AT RIGHT, APPEARANCE OF COMPLETED CONSTRUCTION

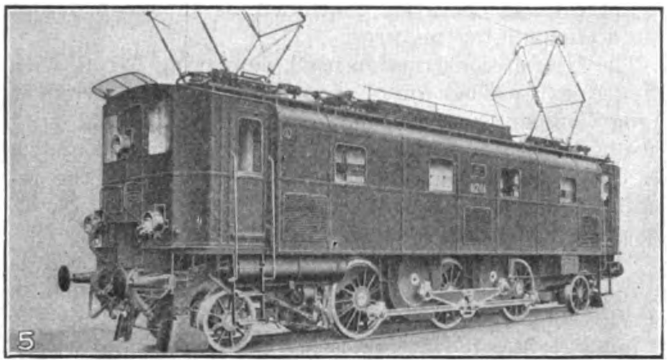
Representative Types of Swiss Electric Locomotives

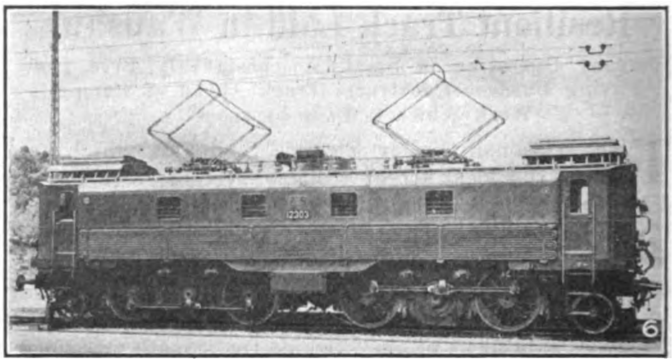


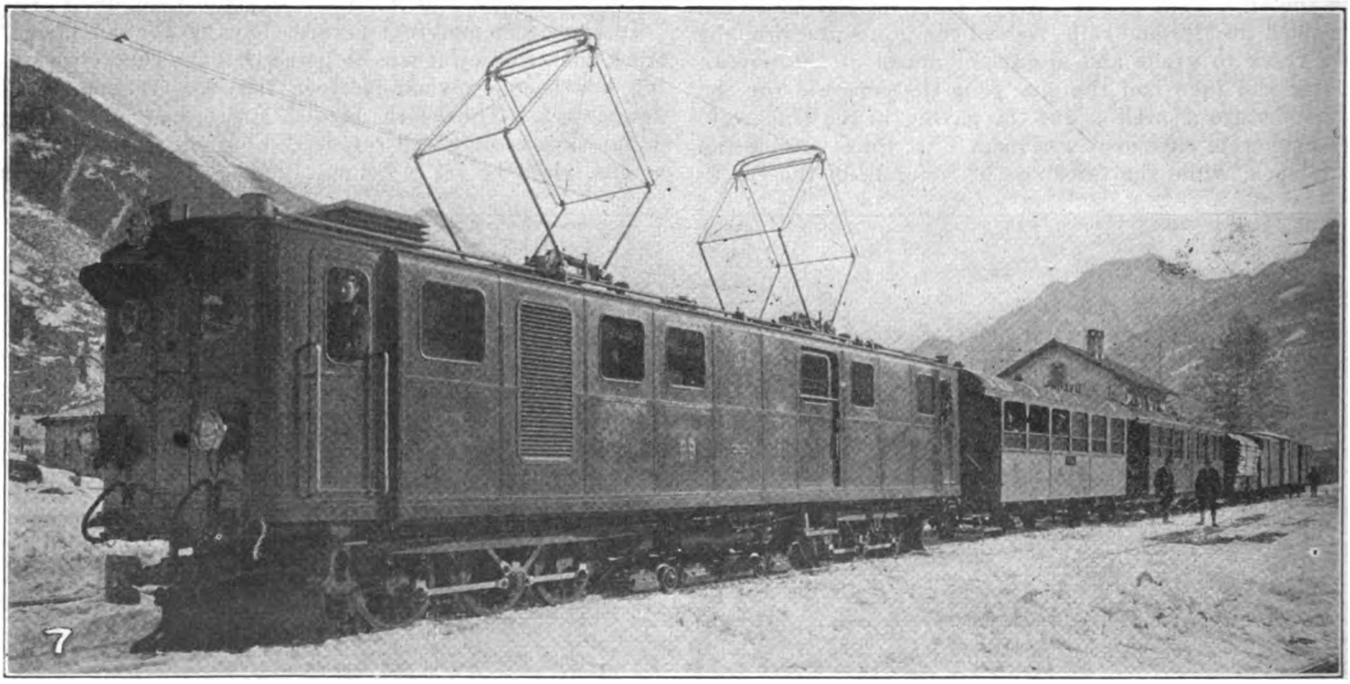












No. 1—Single-phase locomotive for the Bernische Dekretsbahnen made by B. B. & Cie.

No. 2—Latest three-phase type BB locomotive (BBC) for the Burgdorf-Thun Railway.

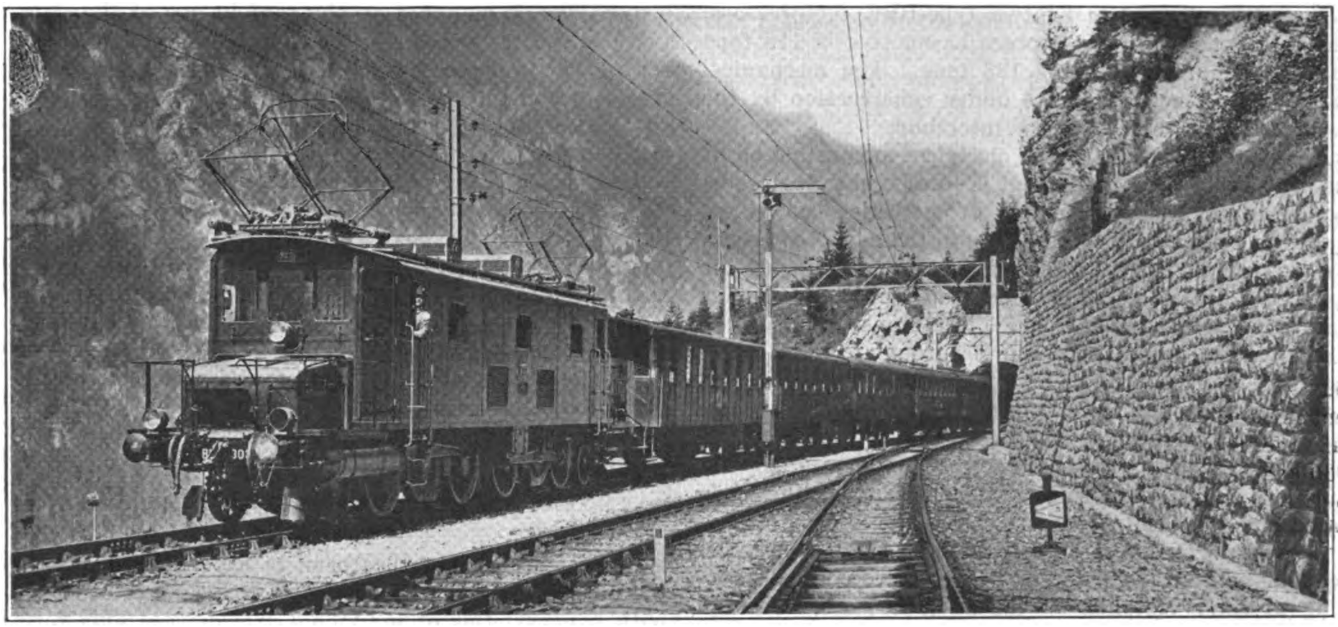
No. 3—Swiss Federal Railways locomotive—an Oerlikon type 1-B-B-1.

No. 4—A three-phase Oerlikon locomotive, Italian State Railways.

No. 5—A-1-C-1 type Oerlikon locomotive used on the Swiss Federal Railways.

No. 6—One of the type 1-B-B-1 locomotives (BBC) used in the St. Gotthard Railway electrification.

No. 7—Bernina Railway type CC single-phase freight locomotive made by Brown, Boveri & Cie. with a 100-ton train at Poschiavo station.



A TYPE 1-BB-1 OERLIKON LOCOMOTIVE OF THE BERNESE RAILWAY

Swiss Electric Locomotive Progress

Details Are Given of Recent Locomotives Equipped by the Leading Two Builders of Electrical Apparatus in Switzerland—Particular Attention Is Given to the Machines for the Federal Railways—Some Experiments with New Types of Drive Are Included, Indicating a Leaning Toward Gears as a Substitute for Side Rods

THE electrification situation in Switzerland was briefly summarized in the issue of this paper for Jan. 1. For that issue the important Swiss manufacturers of electrical equipment, Brown, Boveri & Cie., Baden, and the Ateliers de Construction Oerlikon, Zurich, had arranged to furnish the latest information on the electric locomotive construction of these companies. However, owing to the post-war slowness of the mails the information arrived too late for the annual statistical issue, but it is given in part below. The purpose of this article is to give interesting detail regarding some of the latest commercial and experimental locomotives, for the purpose of indicating the nature of the problems which the necessity for immediate electrification has imposed on the engineers of Switzerland.

LOCOMOTIVES FOR ST. GOTTHARD

Pre-eminent at the moment is, of course, the St. Gotthard electrification, now in partial operation. An illustrated and detailed description of the freight locomotive furnished by the Oerlikon Company appeared in the issue of this paper for Aug. 7, 1920, page 256. Of this type, 1-C-C-1, thirty-three machines have been ordered up to about Jan. 1. This company is also furnishing locomotives of two other types for fast trains, 1-C-1 and 1-B-B-1. Data regarding all of these are given in Table I, and the appearance of the 1-B-B-1 machine is shown in the photographs reproduced.

A number of locomotives have also been furnished for the St. Gotthard electrification by Brown, Boveri & Cie. The plan of the State Railways before the war was to conduct extensive experiments on the Loetschberg line with several types of locomotives for the St. Gotthard electrification, but the critical coal shortage forced the prompt completion of the initial installation. Brown, Boveri & Cie. are building two types of locomotives for this line, one for express passenger trains, the other for freight trains. Following are some details of the former:

The running gear of the machine is in two sections, each containing two driving axles and a pony axle. The two trucks are connected by means of a flexible coupling. Two motors of a truck drive, through pinions, a gear mounted on a jackshaft which is connected by connecting rods with the driving axles. To reduce the vibration due to the single-phase current all pinions are provided with rims flexibly mounted on the centers. This also insures uniformity in contact of the gears on the two sides, the transmission being bilateral, with a 90-deg. angular displacement of the two drives.

The cab rests on two supports on each truck. The center plate of one is fixed, while longitudinal movement of the other is provided. This prevents any transmission of force from truck to truck through the cab. There are also auxiliary points of support for the cab to distribute the weight properly. These are near the interior motor axles.

The locomotive is equipped with Westinghouse air brakes, four brakeshoes to the driving axle. The compressed air for brakes, sanders, whistles and electrical

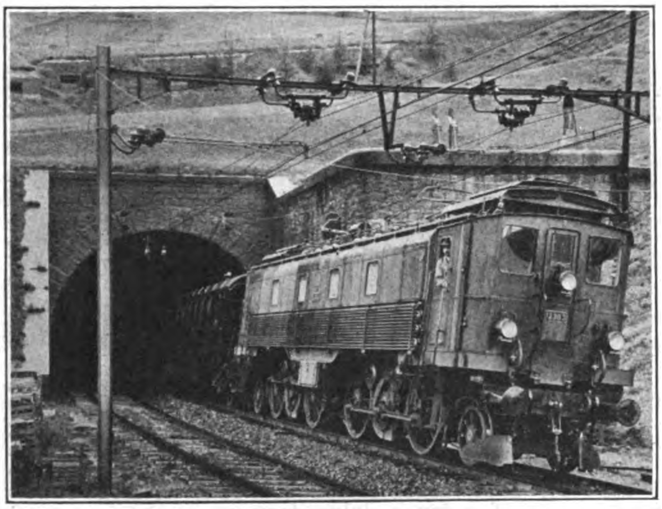
TABLE I—DATA OF OERLIKON LOCOMOTIVES FOR ST. GOTTHARD ELECTRIFICATION

	1-C-1	1-B-B-1	1-C-C-1
Maximum tractive effort, pounds	24,800	39,600	52,900
Horsepower at wheel rim (1½ hour)	1,650	2,250	2,200
Normal speed, miles per hour	32	32	21.7
Maximum speed, miles per hour	66.6	66.6	40.4
Trailing load on 2.6 per cent grade at normal speed, tons	237	330	475
Weight complete with equipment, tons	100	125	141
Maximum wheel pressure, tons	10.7	11.0	10.0
Total length	44 ft. 4 in.	53 ft. 2 in.	63 ft. 7 in.
With or without regeneration	Without	With	With

apparatus is furnished by two type-BBC compressors. The total weight of the express locomotive is 118 tons and the freight locomotive 133 tons. The mechanical parts of the locomotives are under construction by the Swiss Locomotive Works at Winterthur.

In the arrangement of the electrical apparatus, all of the principal control equipment is so related to the transformer as to form a complete group which can be installed or removed through a hole in the roof. The tank of the transformer is designed for the support of the apparatus, its sides being constructed of strong plates reinforced with angle irons. The transformer oil is circulated by means of a pump through cooling pipes mounted on the side walls of the cab. This arrangement is said to provide a transformer system no heavier than one involving air cooling. The transformer, of 1,730-kva. capacity, lowers the voltage from 15,000 or 7,500 to 1,325. Its weight without the cooling coils and pump is 27,560 lb.

Current is taken from the line through two independent pantographs. After flowing through the lightning arrester installed on the roof, it passes through the high-tension circuit breaker and the transformer, thence by way of the motors and the trucks to the rails. The high-tension breaker is installed in an opening provided in the roof.



TRAIN LEAVING THE ST. GOTTHARD TUNNEL AT AIROLO

The four motors of one locomotive form two groups, connected in parallel, the two motors of each group being in series. The series connection is permissible because the motors are mechanically coupled. The motors are of the series compensated type, with a commutating field. Between the armature inductors and the commutator are resistors so placed as to be well ventilated. Regulation of speed is by variation of voltage in eighteen steps from 237 to 1,325 volts (for two motors in series). The voltage is varied by means of an ingenious commutator resembling a storage battery regulator, but with auxiliary switches which break the local circuit as the brushes pass from contact to contact. The locomotives are provided with multiple-unit control so that two can be operated as a unit.

An essential feature of these locomotives will be provision for electric braking for the purpose of reducing brakeshoe wear and the consequent dissemination of iron dust in and about the machine. It was not considered necessary to provide for return of power to the line. A sample locomotive has been provided with resistors, shown mounted on the roof in one of the illustrations, which absorbs on down grades the direct-current power produced by the motors. The location of the resistors was selected to provide maximum natural ventilation. If this type of braking process is satisfactory other locomotives will be similarly equipped.

The locomotives mentioned above are designed for the Erstfeld-Chiasso section of the St. Gotthard electrification, which will be next equipped. For this work the passenger locomotive must climb a 2.6 per cent grade with a 330-ton train at 22 and 31 m.p.h., and the freight locomotive must draw the same load up this grade at 31 m.p.h. or 473 tons at 22 m.p.h. The power developed on the grades is 2,500 hp., with tractive efforts for the two locomotives respectively of 27,500 lb. and 37,400 lb. On the maximum grade the values are 35,200 lb. and 48,400 lb.

NEW TYPE OF LOCOMOTIVE WITH INDIVIDUAL DRIVE OF AXLES

A locomotive which has been in experimental use on the Loetschberg line for nearly two years is equipped with two varieties of individual axle drive. This form of drive has not yet been generally employed in Europe, although it has been popular in America. In Europe the preference has been for few motors of large power rather than many of small power. The designers of this experimental locomotive recognized as ideal the form of drive used on tramway cars, as it gives a uniform rather than a pulsating transmission of torque, and they applied it here in principle. They found it possible to design a single-phase machine with 300 hp. per axle for a speed of from 22 to 28 m.p.h. A motor of this kind weighs, with gears, about 13,200 lb. Application of direct drive of this sort is difficult, however, for express train locomotives. For European conditions three motor axles are in general sufficient, while for the greatest exigencies in express traffic, four driving axles, with 700 to 800 hp. each, are sufficient. This is too much for tramway drive, but even if it were not the necessary speed would be too high.

The present experiment in drive is due to Chief Engineer Tschanz of the Federal Railways. One axle of the locomotive has a drive invented by him, while a second has one designed by Brown, Boveri & Cie.

Both of the schemes involve the placing of the gears outside the driving wheels to insure the maximum space for the motor. In the Tschanz plan the motor is "elastically mounted" on the locomotive underframe. The motor torque is transmitted through an intermediate axle located on about the same level as the motor axle and nearly over the driving axle. Thence the torque is transmitted by means of gears to another axle carried inside the hollow driving axle to a flexible driving coupling on the far side.

In the "BBC" drive the motor is mounted on the locomotive frame directly above the driving axle. The motor torque is transmitted by means of pinions, one on each end of the axle, to gears carried by the locomotive frame and located outside of and directly opposite the driving wheels. Thence it is transferred over to the latter by means of an ingenious link and gear coupling which permits relative vertical movement of the driving gear and the locomotive driving wheel. With this design it would be possible to use a motor as large as 1,000 hp. The external arrangement of gear is said to be particularly advantageous with respect to inspection.

The experimental locomotive has given satisfaction in service and both types of drive have worked well.

Among other interesting recent Swiss locomotives is the new three-phase machine built by Brown, Boveri & Cie. for the Burgdorf-Thun line. This is of extremely simple mechanical construction, with two swivel trucks, each carrying one motor; a design which could be adopted on account of the small power capacity required. In the middle of each truck is a 260-hp. motor geared to a jackshaft, which, through cranks and connecting rods, drives the two axles. As in other drives of this general type the driving pin on the crank works in a vertical slot in the center of the connecting rod so as to permit some vertical movement of the pin with relation to the connecting rod, thus providing for displacement of the truck springs.

The electrical equipment is designed for the mean line voltage of 750, but provision is made for an increase to 1,500. The frequency is 40 cycles per second. Four speeds are provided by means of pole changes as follows: 8.7 m.p.h., 12 poles; 12.4 m.p.h., 8 poles; 18 m.p.h., 6 poles; 27.3 m.p.h., 4 poles. The respective tractive efforts on an hourly rating are 21,300, 15,000, 10,200 and 6,800 lb. The rotor is of the "squirrel-cage" variety, regulation of starting voltage applied to the stator being provided by means of two auto-transformers connected in "V," with taps for various voltages from 214 to 900. At the lower two speeds the stator is "delta-connected"; at the higher speeds, "star-connected." It has two independent windings to permit the changing of the number of poles.

The locomotive is provided with a roomy cab which is available for the auxiliary apparatus, the smaller parts of which are inclosed in cabinets along the walls. Projecting from each end of the cab is a hood which covers the motors and transformer and commutating switch. The total weight of the machine is 96,600 lb., almost equally divided among the four axles.

The Burgdorf-Thun Railway, which is the most important three-phase line in Switzerland, has also ordered two motor cars of an entirely new type from the Oerlikon works. As this article, however, deals with locomotives, details of the motor car will not be given here.

The accompanying illustrations of typical Oerlikon and "BBC" locomotives have been selected to indicate the present trend in Swiss design.

Hunters Find a Canvas Back

A RAILWAY company that had been accustomed to the operation of the old style non-ventilated motor placed in service a number of safety cars equipped with the modern light-weight ventilated type of motor. Recently this company had several cases of roasted armatures develop on these motors and there was no apparent cause for the trouble, as all motors were operating under the same service conditions.

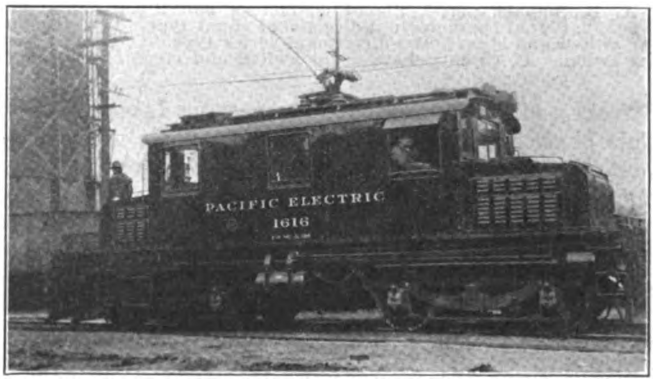
About this time, in connection with service tests that were being made on these cars, the temperatures of the motors were taken at the end of the test run, and to the surprise of the testing force it was noted that the temperature of the No. 2 armature on one of the cars was 35 deg. above that of the No. 1 armature. It was at first thought that perhaps the No. 1 motor was cut out by the operator due to some temporary trouble, but this was not the case. It was then intimated that probably there was some error in the car wiring that had overloaded the No. 2 motor, but the car wiring was found to be O.K. Finally, during the making of a careful inspection of the motors, it was discovered that the No. 2 motor had a strip of canvas under the ventilating covers at the air outlet of the motor frame, thus choking the ventilation of this motor and accounting for the dangerous operating temperatures.

When the carhouse men were questioned it was found that on account of the heavy snows all motors had been closed in the above manner to keep out the snow and water during the winter season. This canvas was supposed to be removed from all motors when the warm weather set in, but apparently this frame was missed, and this carelessness on the part of the carhouse men was responsible for the roasted armatures.

This incident helped to drive home a very important point regarding the keeping of records on armature failures, as it was suggested that if such information had been available on this property the cause of the trouble might readily have been run down by tying up all armature failures to a particular motor frame in position No. 2 on a definite car.

New Locomotives in Service on Pacific Electric Railway

THE Pacific Electric Railway has recently purchased from the Westinghouse Electric & Manufacturing Company two 1,000-hp. locomotives to be used in its interurban freight service. The volume of this traffic has been steadily increasing, especially on the heavy hauls from Los Angeles harbor to the city of Los Angeles, and these two locomotives, together with the fifteen original ones, were needed to handle the traffic.



NEW INTERURBAN FREIGHT LOCOMOTIVE ON THE PACIFIC ELECTRIC RAILWAY

The new locomotives, weighing about 129,000 lb., are 3,000 lb. heavier, although similar in class to those already in use. They are of the steeple double-truck type, having four 250-hp. motors.

The principal improvement is the use of two air compressors having a combined capacity of 150 cu.ft. of air per minute, compared with a total capacity of 100 cu.ft. per minute of the compressors on the older locomotives. The improved and larger compressors are of the three-stage intercooler type driven by a compound dynamotor.

CHARACTERISTIC DATA FOR LOCOMOTIVES

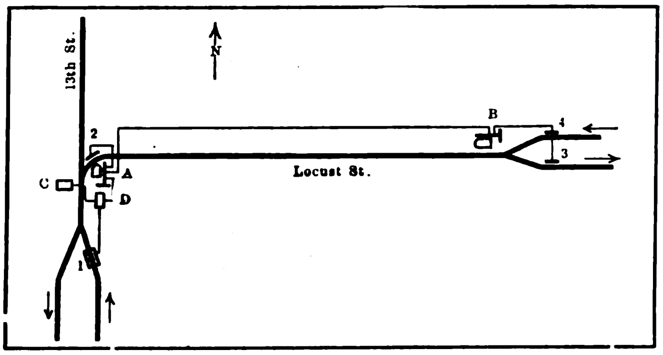
Maximum tractive effort	30,000 lb.
Normal tractive effort at 18 m.p.h.	21,000 lb.
Continuous tractive effort with forced ventilation	11,520 lb.
Maximum trailing load	1,200 tons
Average trailing load	600 tons
Maximum speed on level with 600-ton load	25 m.p.h.
Maximum speed on 4 per cent grade with 600-ton load	10 m.p.h.

Combined Signal and Switch Installation

Somewhat Novel Equipment Consisting of an Electric Track Switch Operating in Conjunction with Block Signals on a Single Track Installed by the Terre Haute Company

AMONG the latest additions to the equipment of the Terre Haute Traction & Light Company of Terre Haute, Ind., is an electrically operated track switch which works in connection with a block of automatic signals.

As is indicated in the accompanying diagram, a line of cars runs north and south on Thirteenth Street through a short block of single track that is not signaled. At the corner of Thirteenth and Locust Streets a single-track line turns east on Locust Street. This block is provided with Nachod signals which prevent opposing movements through the block but permit several cars to follow at the same time. A northbound Thirteenth Street car drifting under the current selective contactor 1, which is located about 75 ft. back of the switch point, will not operate the block signals on Locust Street, but will insure the switch point being thrown for the straight track on Thirteenth Street. In order to throw the switch point for the diverging route into Locust Street, a car passing under the selective contactor 1 must apply two or more points of power. This throws the switch point for the turn into Locust Street and also sets the signals. Signal B, at the opposite end of the block on Locust Street, will indicate "Stop" and signal A, located an observation distance ahead of contactor 1, will then show "Permissive." As the car leaves the block at the other end on Locust Street, in passing under contactor 3 it restores both signals to the normal neutral or clear indication.



SWITCH AND SIGNAL INSTALLATION IN TERRE HAUTE

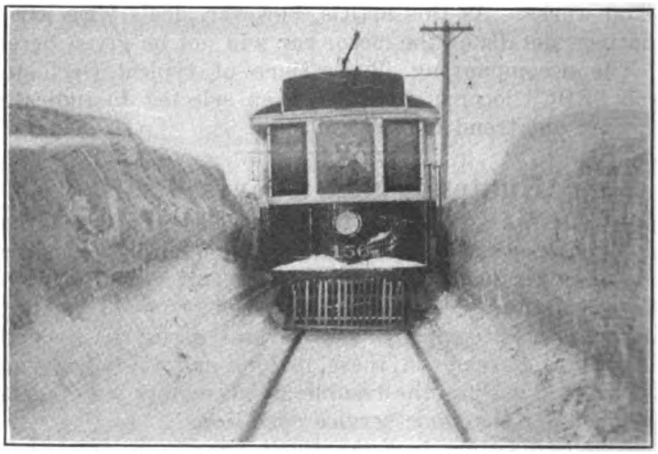
A, B, Signals. 3, 4, Signal contactors non-directional shunt type. 2, Signal contactor uni-directional shunt type. 1, Contactor for switch and signal, non-directional series type. C, Ground box for switch. D, Circuit changer for switch and signal.

A Locust Street car coming west will set signal A at "Stop" and prevent an opposing movement while passing under contactor 4. Signal B will also be set at "Permissive." As the car passes under contactor 2 it will clear the block, providing, of course, that a second car has not followed the first at the permissive signal B, in which case the signal will not be cleared until the same number of cars have passed southward out of the block under contactor 2 as have entered the block under contactor 4. Contactor 2 is inoperative when traversed in the opposite direction. The signals give indication by lights and disks of the same color for each indication.

The Cheatham switch used consists of a powerful double solenoid having a single armature so connected to the switch point as to throw it to either position according to which coil is energized. Each solenoid of this switch will exert a pull of over 400 lb. These solenoids are installed in a waterproof cylinder housed in a ground box with a removable cover. A relay or circuit changer is mounted on a pole near the switch. The contactor is of the series type without moving parts, the front and back contacts on the armature being connected respectively to the two switch operating solenoids. The current selective relay is adjusted so as not to pick up its armature with the current used for light, heaters and the compressor motor, but it will pick up on application of one or two points of power through the car motor. The circuit changer box also contains a time limit relay which will open the circuit to the operating solenoids and thus prevent their burning out if the car stands on the contactor for a period of more than five seconds. In operating with the Cheatham switch the motorman need not observe the switchpoint, but will always draw power under the contactor for the diverging route and will drift for the straight route irrespective of the previous position of the switchpoint.

Should it be desirable to signal the single-track block on Thirteenth Street contactor 1 may still be connected so that cars drifting under it will throw the switch and set the signals for Thirteenth Street and cars using power under this contactor will throw the switch and set the signals for Locust Street. With the installation of this equipment every important switching point on this property has been equipped with the heavy type of switches and locks. The signals used were furnished by the Nachod Signal Company, Inc., and the switches by the Cheatham Electric Switching Device Company. The installation was supervised by an engineer from the manufacturers.

Spring Snow in Winnipeg



SNOW CONDITION IN WINNIPEG

THE accompanying illustration shows the conditions with which the Winnipeg (Canada) Electric Railway is contending this spring. The snowstorm which caused the snow banks shown fell on March 16, and the photographs were taken on March 29, 1921. There had been no thaw or additional snowfall between those dates. The snowfighting equipment used by this railway was described in an article in the ELECTRIC RAILWAY JOURNAL for Feb. 19, 1921. It rendered efficient service in combating this belated storm.

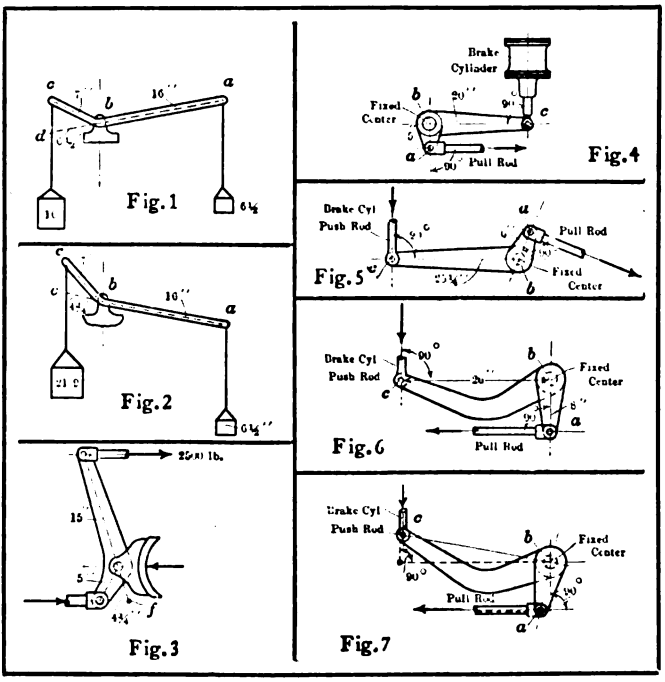
Determination of Forces on Eccentric Levers and Bell Cranks*

Methods for Determining the Forces Developed by Eccentric Levers and Standard Bell Cranks Are Given, Also General Methods of Applying the Leverage Rule, Together with Simplified Solutions and Rules for Solving Brake Leverage Problems by Using the Proportional Lengths of Levers Instead of Their Actual Length

BY H. M. P. MURPHY

THE eccentric type of lever was previously described and illustrated in the first article of this series published in the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921. It may always be treated as a modified form of the straight-line lever when the subject of force multiplication is involved, providing that the following instructions are carefully observed. The reasons for this will be made apparent by the subsequent illustrations and examples.

When an eccentric lever is in the exact position in which it is to perform its duty, the forces acting upon it may be determined thus: Extend the straight line, passing through the middle point and one end point of the lever, till it meets the line of action of the force acting at the other end point, then consider this straight line as a simple straight-line lever and apply the same rules to it as to any straight-line lever. The three points of such a lever are, of course, the middle point, and the end point of the eccentric lever through which the straight line passes, and the point at which this line meets the line of action of the force acting at the other end point of the eccentric lever. It is important to note here that the forces acting on an eccentric type of lever must be parallel, just as in the case of the straight-line lever.



COMMON FORMS OF ECCENTRIC LEVERS AND BELL CRANKS

Figs. 1 and 2—Diagrams to illustrate forces developed.
Fig. 3—Practical form of eccentric lever.
Figs. 4, 5, 6 and 7—Various forms of bell cranks.

FORCES DEVELOPED BY ECCENTRIC LEVERS

In order to illustrate the use of the preceding rule, consider the eccentric lever shown in Fig. 1 and let a weight of 6½ lb. be suspended from the point *a*, then to find the weight which must be suspended from the point *c* (*i.e.*, to find the force developed at the point *c*) in order to produce equilibrium, draw a straight line through the points *a* and *b*, and extend it till it cuts the line of action of the left-hand weight at a point *d*. Now consider the line *a b d* as a straight-line lever, then by applying the "Leverage Rule" and considering the middle point, *b*, as the fulcrum,

$$\text{The desired force} = \frac{(\text{the known force}) \times (\text{the lever arm of the known force})}{\text{the lever arm of the desired force}}$$

or

$$\text{Force acting at } d \text{ (or } c) = \frac{(\text{Force acting at } a) \times (\text{Lever arm of force at } a)}{\text{Lever arm of force at } d \text{ (or } c)}$$

$$\text{Force acting at } d \text{ (or } c) = \frac{6.5 \times 16}{6.5} = 16 \text{ lb.}$$

The length of the lever arm, *b d*, is, of course, obtained by measuring the actual rigging or a scaled drawing. The force acting at the point, *b*, may also be found by the same method, thus, applying the "Leverage Rule" and considering the point *d* as the fulcrum,

$$\text{Force acting at point } b = \frac{6.5 \times 22.5}{6.5} = 22.5 \text{ lb.}$$

which is correct for force at *a* plus force at *d* must equal force at *b* (see Article 1), that is 6.5 + 16 = 22.5 lb.

Now suppose that the eccentric lever shown in Fig. 1 is swung through a slight angle, about the point *b*, and is thus brought into the position shown in Fig. 2, and let it be required to find what weight (that is, force) must be applied at *c* to balance a weight of 6½ lb. applied at *a*. To solve this problem, draw a straight line through the points *a* and *b* and produce it till it intersects the line of action of the left-hand force at the point *e*. It will be readily seen from the construction of the lever (shown in Figs. 1 and 2) that the line *b e* is much shorter than the line *b d*, consequently a greater force must be applied at the point *c* to balance the 6½-lb. weight applied at *a* in the case under consideration than in the preceding example. To find the force acting at

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*This is the fourth of a series of articles on forces developed in brake riggings. Others appeared in the Jan. 15, Feb. 19 and March 19 issues of this paper.

c, Fig. 2, consider the middle point, *b*, of the straight-line lever, *a b e*, as the fulcrum, then,

$$\text{Force acting at } e \text{ (or } c) = \frac{6.5 \times 16}{4.75} = 21.9 \text{ lb.}$$

and in this case the force acting at *b* is 28.4 lb.

IMPORTANT FACTS DEDUCED FROM EXAMPLES

The preceding examples show that when considered in some specified position the forces acting on an eccentric lever may be easily found by the simple method outlined in the first part of this article, but that, although the force acting at one point of an eccentric lever may be constant, the forces acting at the remaining points depend not only on the dimensions of the lever but also on the position of the lever. It should be noted here that as previously pointed out, this is not the case with the straight-line type of lever, the forces acting on which are entirely independent of the position or angle of the lever, and which, therefore, always bear the same fixed relation to each other, this relation depending only on the dimensions of the lever. For these reasons it is obvious that an eccentric type of lever is an extremely undesirable form to use in brake riggings, because as the brakeshoes wear, the leverage ratio will continually change, either becoming greater or less than the amount desired.

A practical form of eccentric lever is illustrated in Fig. 3. This type is found most frequently in traction service where the clearances are small and therefore where it is sometimes quite impossible to use the straight-line lever. As an example, let it be required to find the force delivered to the brakeshoe, in Fig. 3 when a force of 2,500 lb. acts on the pull rod attached to the upper end point of the lever. By drawing a straight line as indicated through the upper end point and the middle point of the lever and continuing it till it meets the line of action of the lower end force, and then measuring the length of this line (4¾ in.), and considering the point of intersection *f* as the fulcrum, we have:

$$\text{Force on brake beam} = \frac{2{,}500 \times 19.75}{4.75} = 10{,}395 \text{ lb.}$$

PRINCIPLES OF BELL CRANKS

It is important to state here that an eccentric lever must not be confused with the form of force-multiplying device known as a "bell crank," the standard form of which may be defined as follows:

A standard bell crank is a force-multiplying device which is adapted to maintain a fixed relation between the forces involved, and which consists of two rigid arms or bars securely connected with each other through the medium of a shaft. The standard form of bell crank must always be so constructed and installed that both arms will be acted upon at their free ends by independent forces which maintain constant directions, such that their lines of action will simultaneously form 90-deg. angles with the center lines of their respective arms.

It will be readily seen from the preceding definition that the forces acting on a bell crank of standard design are parallel only when the shaft center and the two end points lie in the same straight line. Bell cranks of various forms are illustrated in Figs. 4, 5, 6 and 7, where it will be noted that the center line of each arm is simply a straight line drawn through the end point (or pin center) of the arm and the shaft center, whether the arm is straight or curved between these points. It will also be seen that the angle made by the center lines of the two arms may have any value whatever, as shown in Fig. 5, but usually for railway brake riggings this angle is given a 90 or 180 deg. value because of the location of the brake cylinders on locomotives, where the bell crank is most frequently used.

In this connection it should be pointed out that as the force action on the shaft of a bell crank is quite complicated and as the shaft is always supported by a fixed bearing, only the two forces acting at the free ends of the arms will be considered in the following discussion. The bearing forces are, of course, of no importance in any problem involving the subject of braking power. It should, moreover, be noted that a standard bell crank will always maintain a fixed relation between the forces acting on it, regardless of the position of the crank, providing that the lines of action of the various forces remain parallel to their own standard directions. Thus, if in Fig. 6, a given force be applied to the brake cylinder push rod, a certain definite force will be developed on the pull rod, and this force will remain constant no matter what angle the bell crank may be swung through, providing that the line of action of the push rod force remains vertical and the line of action of the pull rod force remains horizontal, as shown in Fig. 7. Of course, in practice it is impossible always to maintain these exact ideal conditions, but when they are obtained approximately the forces concerned will differ so slightly from the desired values that the variations produced need not be considered. This is also true of the "straight-line" type of lever.

DEFINITION OF "LEVER ARM" FOR A STANDARD BELL CRANK

The fixed, or shaft, center of a bell crank should always be considered as the fulcrum, or point about which the crank turns, for the end forces are the only ones which it is necessary to determine in braking power computations. Keeping this fact in mind the following definition will be readily understood:

The lever arm of a force acting at the free end of one of the arms of a standard bell crank is simply the straight line distance between the fulcrum (*i.e.*, shaft center) and the point of application of the specified force.

In order to obtain a clear understanding of the preceding definition, it will be well to refer to Figs. 4, 5 and 6, and to note that in each case when the point *b* is considered as the fulcrum the lever arm of the pull rod force is the line *b a* and the lever arm of the brake cylinder force is *b c*.

If the definition of the term "lever arm" for a standard bell crank is kept clearly in mind and if either one of the two end forces acting on the crank is known, the remaining force may always be found by aid of the "Leverage Rule" which was previously given for straight line levers (see article 1); that is,

$$\text{The desired force} = \frac{(\text{The known force}) \times (\text{The lever arm of the known force})}{\text{The lever arm of the desired force}}$$

To illustrate the method of determining the forces acting on a standard bell crank let us consider the standard bell crank shown in Fig. 4 and let it be required to find the force acting on the pull rod when the dimensions are as indicated and a 14-in. diameter brake cylinder is used, the air pressure being 50 lb. per square inch.

The table previously published in article 3 of this series gives the total force on the push rod as 7,697 lb., then by applying the "Leverage Rule" and considering the shaft center (or middle point) as the fulcrum,

$$\text{Force on pull rod} = \frac{(\text{Force on push rod}) \times (\text{lever arm of force on push rod})}{\text{lever arm of force on pull rod}}$$

$$\text{Force on pull rod} = \frac{7{,}697 \times 20}{5} = 30{,}788 \text{ lb.}$$

Now consider the standard bell crank shown in Fig. 5, and let it be required to find the force acting on the pull rod, when the force on the brake cylinder push rod is equal to 6,786 lb.

To solve this problem, consider the shaft center as the fulcrum, then, by applying the "Leverage Rule,"

$$\text{Force on pull rod} = \frac{6{,}786 \times 25.25}{6} = 28{,}558 \text{ lb.}$$

Next consider the standard bell crank shown in Figs. 6 and 7 and let it be required to find the force acting on the pull rod, when a force of 10,053 lb. acts on the brake cylinder push rod.

To solve this problem, consider the shaft center as the fulcrum, then, by applying the "Leverage Rule,"

$$\text{Force on pull rod} = \frac{10{,}053 \times 26}{8} = 32{,}672 \text{ lb.}$$

The preceding discussions of levers and bell cranks have shown that in order to determine the forces acting on (or developed by) these types of multiplying devices it is merely necessary properly to apply the "Leverage Rule" given in article 1. Consequently, it will now be well to restate this rule in a more general way and to give a brief summary of the simple but important considerations involved in its correct use.

When the force applied at one of the points (or pin centers) of a lever or bell crank is known and it is desired to find the force developed at a second point, consider the third (*i.e.*, remaining) point as the fulcrum, then the desired force may be found by multiplying the known force by its own lever arm and dividing this product by the lever arm of the desired force.

This rule may, as previously stated, be expressed in the following mathematical form:

$$\text{The desired force} = \frac{(\text{The known force}) \times (\text{the lever arm of the known force})}{\text{the lever arm of the desired force}}$$

In order properly to apply the "General Leverage Rule" it is merely necessary to remember that the lever arm of any force always depends upon the location of the point considered as the fulcrum and is simply a straight-line distance which must be measured in the manner described in each case. It is also essential to note that the shaft center of a bell crank is the only point which it is ever desirable to select as a fulcrum, but that any one of the three points of a lever may properly be considered as a fulcrum whether there is a fixed point or not.

Attention should, moreover, be called to the fact that the "General Leverage Rule" is based on the assumptions that the three forces acting on a lever are always parallel to each other and that each of the end forces acting on a bell crank remains parallel to its standard direction. It is, therefore, essential that these conditions be fulfilled as closely as possible in practice, in order that the forces concerned may bear the proper relations to each other. Slight variations from this desired state of affairs are always met with in actual constructions, but the degree of variation is so small in all good designs of brake riggings that it may be neglected.

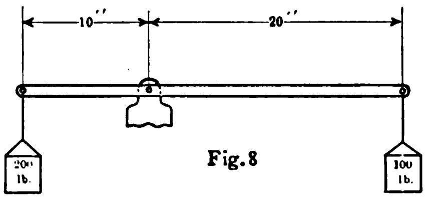


Fig. 8

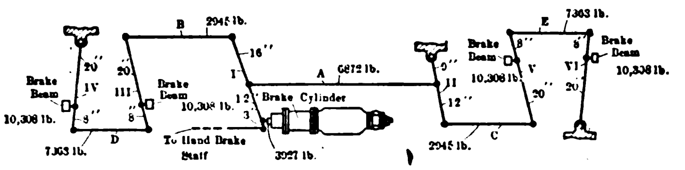


Fig. 10

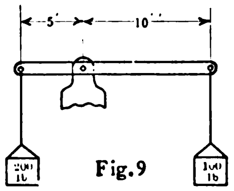


Fig. 9

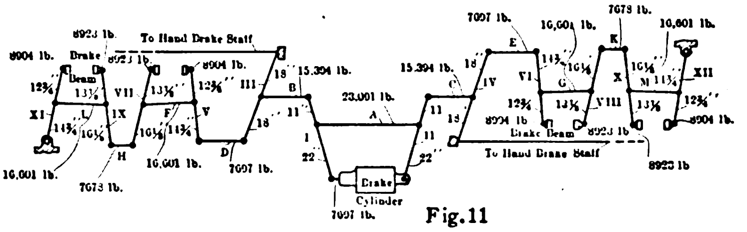


Fig. 11

FIGS. 8 AND 9. DIAGRAMS TO ILLUSTRATE LEVER RATIOS. FIGS. 10 AND 11. BRAKE RIGGING DIAGRAMS

LEVER RATIOS AND SIMPLIFIED METHODS FOR THE SOLUTION OF BRAKE LEVERAGE PROBLEMS

In all of the preceding discussions of the subject of leverage the actual dimensions of each lever and bell crank were always given when the forces developed were required, but obviously this is not absolutely necessary, as it is simply the comparative lengths of the lever arms that are essential: For example, as shown in Fig. 8, if a weight of 100 lb. is suspended from the end point of a lever at a distance of 20 in. from the middle point, a force of 200 lb. will be developed at the other end point, if it be located at 10 in. from the middle point. It is also equally clear, as indicated in Fig. 9, that if a weight of 100 lb. act at one end point of a lever at 10 in. from the middle point, a force of 200 lb. will also be developed at the other end point if it be located at 5 in. from the middle point. These facts may be demonstrated by aid of the "Leverage Rule" as follows:

In the first case:

Weight on short arm =

$$\frac{100 \times 20}{10} = 100 \times \frac{20}{10} = 100 \times 2 = 200$$

And in the second case:

Weight on short arm =

$$\frac{100 \times 10}{5} = 100 \times \frac{10}{5} = 100 \times 2 = 200$$

It is therefore perfectly obvious that the relation existing between any two forces acting on a lever depend only on the comparative lengths of the lever arms concerned; that is, on the ratio of one of the lever arms to the other. Consequently it is quite common practice to speak of a lever as being divided in a certain ratio if it is distinctly understood that a certain definite point is considered as the fulcrum. When using this expression (*i.e.*, "lever ratio") it should, however, be emphasized that it is positively absurd to do so unless the assumed fulcrum be clearly specified; for example, the lever shown in Fig. 8 has a ratio of 2 to 1 when the middle point is considered as the fulcrum, a ratio of 3 to 1 when the left-hand end point is considered as the fulcrum and a ratio of 3 to 2 when the right-hand end is considered as the fulcrum. Much confusion is, therefore, apt to arise from an improper use of the term "lever ratio," and consequently it is strongly recommended that such an expression never be employed unless a positive means of reference is furnished, such as a sketch, when the ratio of one clearly specified lever arm to another may be mentioned without any possibility of confusion.

If the points mentioned in the preceding paragraph are kept clearly in mind, the following rules or laws will prove of much value in simplifying leverage problems.

First—When any two levers are divided in the same ratio with respect to two corresponding points considered as fulcrums these levers will also be divided in equal ratios with respect to all corresponding points.

To illustrate this, consider the levers, I and II, shown in Fig. 10, neglecting the 3-in. extension on lever I for the hand-brake attachment. These levers have the following ratios with respect to the corresponding points mentioned, considered as fulcrums:

With respect to the pull rod end:

$$\text{Ratio of lever I} = \frac{28}{16} = 1\tfrac{3}{4} \text{ to } 1$$

$$\text{Ratio of lever II} = \frac{21}{12} = 1\tfrac{3}{4} \text{ to } 1$$

With respect to the tie rod, *A*, or middle point:

$$\text{Ratio of lever I} = \frac{16}{12} = 1\tfrac{1}{3} \text{ to } 1$$

$$\text{Ratio of lever II} = \frac{12}{9} = 1\tfrac{1}{3} \text{ to } 1$$

With respect of cyl. end of I and fixed end of II:

$$\text{Ratio of lever I} = \frac{28}{12} = 2\tfrac{1}{3} \text{ to } 1$$

$$\text{Ratio of lever II} = \frac{21}{9} = 2\tfrac{1}{3} \text{ to } 1$$

Second—When all of the levers connecting with the right-hand truck of a car are divided in the same ratios, with respect to similar points considered as fulcrums, as the corresponding levers connecting with the left-hand truck, the sum of the forces delivered to the brake beams of one truck will always be exactly equal to the sum of the forces delivered to the brake beams of the other truck.

As an illustration of this again consider the brake rigging shown in Fig. 10, and compare all corresponding levers with each other by considering similar points as the fulcrums; for example, with respect to their middle points, the ratios are:

$$\text{Lever I } \frac{16}{12} = 1\tfrac{1}{3} \text{ to } 1 \qquad \text{Lever II } \frac{12}{9} = 1\tfrac{1}{3} \text{ to } 1$$

$$\text{Lever III } \frac{20}{8} = 2\tfrac{1}{2} \text{ to } 1 \qquad \text{Lever V } \frac{20}{8} = 2\tfrac{1}{2} \text{ to } 1$$

$$\text{Lever IV } \frac{20}{8} = 2\tfrac{1}{2} \text{ to } 1 \qquad \text{Lever VI } \frac{20}{8} = 2\tfrac{1}{2} \text{ to } 1$$

The levers I, III and IV, connecting with the left-hand truck, are divided in the same ratio with respect to similar points (the middle point being considered in each case as the fulcrum) as the corresponding levers, II, V and VI, respectively connecting with the right-hand truck. Consequently the sum of the forces delivered to the brake beams of each truck will be the same. The work of solving this example may therefore be reduced about one-half, for after having found that the sum of the forces delivered to the brake beams of the left-hand truck is equal to 10,308 + 10,308 lb.; that is, to 20,616 lb., the sum of the forces delivered to the brake beams of the right-hand truck is also known to be 20,616 lb., by aid of the foregoing reasoning.

Third—When the live and dead levers on a truck are all divided in the same ratio, with respect to similar points considered as fulcrums, the forces delivered to each of the brake beams will be equal to each other.

To illustrate this again consider the brake rigging shown in Fig. 10. Now the force delivered to the brake beam of lever III is equal to 10,308 lb. Consequently as the truck levers III and IV are divided in the same ratio with respect to similar points, the force delivered to the brake beam of lever IV will also be equal to 10,308 lb., this being determined by aid of the third rule just given, instead of by the long method of calculation given in the third article of this series.

The construction shown in Fig. 11 may also be used to illustrate this principle, for although the ratios of the truck levers are not exactly the same they are so nearly alike that the slight variation is of no practical importance; thus, considering the middle points of levers V, VII, IX and XI as the fulcrums, the ratio of each is:

$$\text{Lever V } \frac{14.75}{12.75} = 1.157 \text{ to } 1$$

$$\text{Lever VII } \frac{16.125}{13.875} = 1.162 \text{ to } 1.$$

$$\text{Lever IX } \frac{16.125}{13.875} = 1.162 \text{ to } 1$$

$$\text{Lever XI } \frac{14.75}{12.75} = 1.157 \text{ to } 1.$$

Consequently, as the force delivered to the brake beam of lever V is equal to 8,904 lb., the forces delivered to the beams of levers VII, IX and XI are also known to be approximately equal to 8,904 lb. by aid of the third law in question. Of course if the ratios of the levers V, VII, IX and XI had been exactly equal, the forces delivered to each of the brake beams would also have been exactly equal. In all cases where the ratios of the truck levers are not equal, or very nearly equal, the short method just illustrated should not be used for their solution.

Fourth—When the two cylinder levers on a car are divided in the same ratio, with respect to similar points, the forces delivered to each of the end pull rods connected to them will be equal.

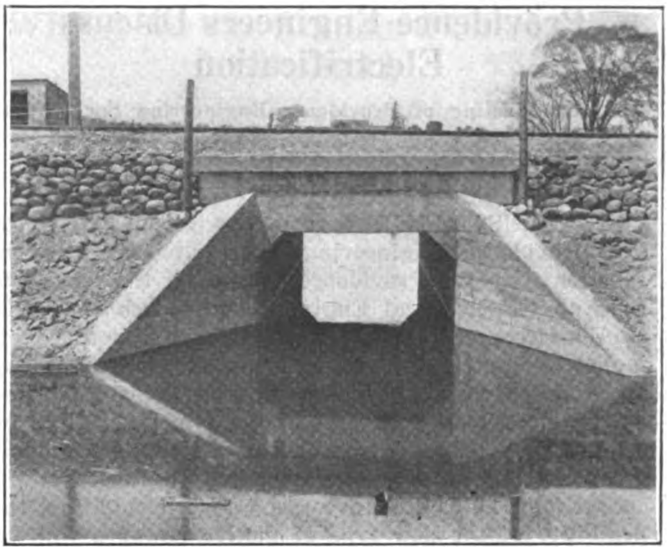
As an illustration of this, consider the cylinder levers I and II in Fig. 10. These levers have already been shown to be divided in the same ratio with respect to similar points, consequently, by the fourth law just stated, if a force of 2,945 lb. is delivered to rod *B*, the same force (2,945 lb.) will also be delivered to the rod *C*; this method will therefore considerably simplify the work otherwise required to obtain the same results.

Raising a 500-Ton Concrete Culvert

A Washout on the Lines of the Rochester & Syracuse Railroad Undermined the Entire Footing of a Culvert, Which Was Successfully Salvaged by Raising to Its Original Position

By D. E. Crouse
Chief Engineer Rochester (N. Y.) & Syracuse Railroad

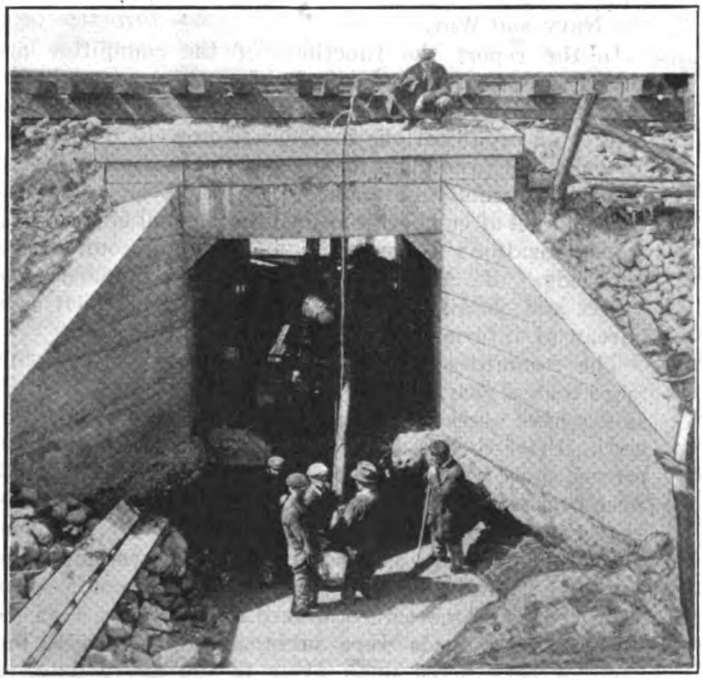
THE accompanying illustrations show various stages of the work of salvaging a 500-ton concrete culvert which was washed out during the spring flood last year on the lines of the Rochester & Syracuse Railroad. The flood undermined the entire footing of the culvert shown and the south end of the culvert dropped about 4 ft. Before the high water subsided timbers were placed over the culvert to carry the railroad traffic, and as soon as the flood abated the normal stream was pumped out dry in order to make an inspection of the damage and ascertain how repairs could be made in an economical and satisfactory manner.



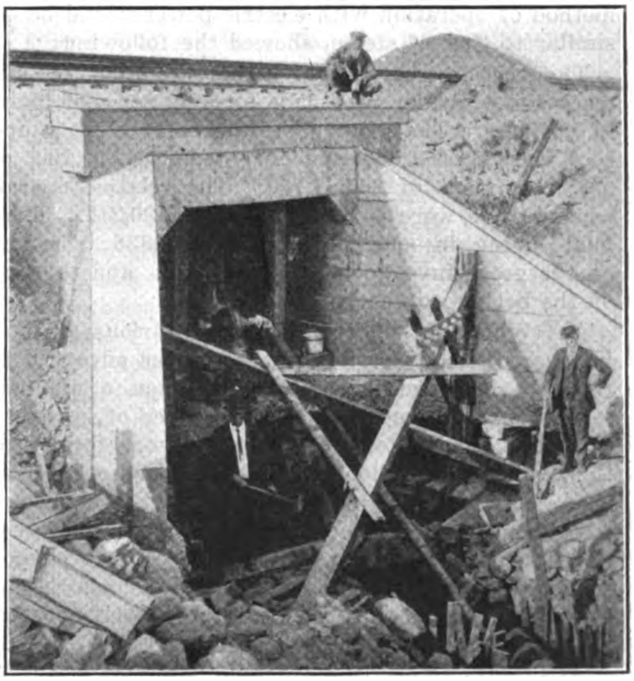
BRIDGE IN PLACE, WITH NORMAL STREAM FLOWING THROUGH AFTER REPAIRS WERE COMPLETED

In order to keep the stream below the foundation level, a 3-in. centrifugal pump was used on the south side and a 4-in. centrifugal pump was placed on the north side of the bridge. As shown in one of the accompanying illustrations it was found that the entire footing was undermined and that the culvert was practically resting on the tips of the wing walls. As there were no fractures in the concrete, it was determined to try and jack the culvert up to its original position and then replace the foundation. Earth was excavated from the sides of the culvert in order to free the batter and jacks were then placed under the entire footing course. Approximately 900 tons capacity in jacks was used and the culvert was successfully raised to its original position without a single fracture developing in the concrete.

With the culvert in place a new footing course was run in and the jacks were removed. The repairs as outlined cost $650, and a replacement of the culvert which otherwise would have been necessary would have cost about $4,000.



BRIDGE AFTER NORMAL STREAM HAD BEEN PUMPED OUT



WALLS EXPOSED AND JACKS PLACED READY FOR RAISING

Providence Engineers Discuss Electrification

At Joint Meeting of Providence Engineering Society and Providence Section A. I. E. E., C. C. Whittaker Outlines Electrification Status on a Number of Steam Railroad Properties

AN ILLUSTRATED lecture was given before the Providence Engineering Society, meeting in conjunction with the Providence Section of the American Institute of Electrical Engineers, on March 15, by C. C. Whittaker, railway engineering department Westinghouse Electric & Manufacturing Company. Among other things he said that studies on the substitution of the electric locomotive for steam motive power on a number of railroads have indicated that the resulting operating economies are sufficient not only to carry the charges on the capital investment but, in addition, the flexibility of the new type of motive power permits a greater volume of traffic to be handled over existing trackage and thereby obviates additional capital expenditure for increased trackage required with steam operation. In some cases it has been found that electrification will permit a road to care for a 75 per cent increase in tonnage with less capital expenditure than would be necessary for the expansion of steam facilities. In most cases the operating economies take care of the fixed charges on the increased capitalization.

In one case it was found that the gross investment for electric operation would be $2,939,000 as compared with $1,090,000 for steam, the net investment therefore being $1,849,000. However, the relative operating expenditures were estimated at $500,760 and $925,165, a saving in operation of $424,405. The return on the gross investment was 14.45 per cent and on the net investment 23.2 per cent. The costs of generated power were practically the same in this case under electric and steam operation, due to the fact that the location was in a coal mine district where coal was cheap.

A study made for a single-track Western railroad, where congestion was not involved and the general method of operation with electric power would be quite similar to that of steam, showed the following:

The section represented 133 route-miles of single track and provision was made for a 40 per cent increase in business. The gross investment for electric operation was $12,561,000 and for steam $3,599,260, or a net investment of $8,961,740. The relative operating expenditures were $3,826,381 and $5,530,217. The annual saving in operation was $1,703,836; the return on the gross investment, 13.6 per cent, and the return on the net investment, 19 per cent.

Mr. Whittaker then took up the various arguments in favor of electrification that have been advanced from time to time and briefly touched upon a number of typical installations. As to the matter of systems, he said that each system in use has reasons for its adoption, which fact is looked upon by broad-minded engineers as the one big factor that has caused the advancement of electric motive power to its present-day position. A decision as to system for a particular road or group of roads should be based upon engineering analysis from the standpoint of present and future requirements.

Among the interesting practical data which Mr. Whittaker gave were some relating to the Pennsylvania Tunnel and Terminal electrification in New York City. Here thirty-three 166-ton electric locomotives, each equipped with two 2,000-hp. motors, have handled all the passenger trains into and out of the New York terminal for the past ten years. They have made a total mileage of more than 7,000,000, with 64,437 miles per locomotive detention and 11,456 miles per minute detention, including mechanical, electrical and man failures. The locomotives require tire turning on account of worn flanges every 50,000 miles on the average, the actual figure varying between 25,000 and 100,000 miles. One engine recorded 142,000 miles between tire turnings. Third-rail shoes require replacement in summer on a 15,000-mile basis and in winter on a 3,000-mile basis. The original commutator has not been turned since it went into service. Motor brushes have lasted for 150,000 miles and motor bearings are renewed on a 30,000-mile basis. The maintenance of these locomotives over an extended period has cost approximately one-sixth that of the equivalent steam locomotives.

Annual Report of the A. E. Standards Committee

This National Clearing House for Technical Information Is Now a "Going Concern"—Contributions from Industrial Associations and Companies Interested Will Be Required to Supplement Dues

ALTHOUGH the annual report of the American Engineering Standards Committee will not appear in final form for some time, from advance galley proofs it is possible to summarize a few of the facts of electric railway interest which it will contain. The committee now comprises the following member bodies: American Electric Railway Association, American Institute of Electrical Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Testing Materials, Electrical Manufacturers' Council, Electric Light & Power Group, Fire Protection Group, Gas Group, National Safety Council, Society of Automotive Engineers, and the United States Departments of Agriculture, the Interior, the Navy and War.

In the report the functions of the committee are stated to be: To unify methods of arriving at engineering standards; to secure co-operation among various interested organizations in order to prevent duplication of work and promulgation of conflicting standards, but not itself formulate standards; to act as an authoritative channel of co-operation in international engineering standardization; to promote in foreign countries a knowledge of American engineering standards; to collect and classify data on standards, and to act as a bureau of information regarding standardization.

The committee has now been actively at work for more than a year, although much of the time and effort so far have necessarily been spent on laying a basis for work. Prior to Dec. 31, 1920, three standards were approved, these bearing respectively the numbers 1, 2 and 3. Specifications and tests for portland cement were approved as "tentative American standards"; specifications for fire tests of material and construction were similarly approved, and certain pipe threads were approved as "American standard."

Several standards were submitted for approval, but had not been acted upon prior to the above date, as follows: As "American standard," the National Electrical Code; as "tentative American standards," a standard test for toughness of rock, a standard method for distillation of bituminous material suitable for road treatment; a standard method for sampling coal; specifications and tests for portland cement; and as "recommended American practice," safety code for head and eye protection. A large number of projects for which sponsorships have been arranged are under way, including such items as rating of electrical machinery, ball bearings, gears, machine tools, nuts and bolt heads, pipe flanges and fittings, screw threads, castings, various safety codes, etc.

The American Engineering Standards Committee, usually referred to as the main committee, composed of forty-seven members, is solely an administrative and policy-forming body and does not concern itself with technical details. Each industry, or branch of industry, is wholly autonomous in its standardization work, the function of the main committee being merely to assure that each body or group concerned in a standard shall have an opportunity to participate in its formulation, which is in the hands of a working committee, technically called a "sectional committee," made up of representatives designated by the various bodies interested, together with other specifically qualified individuals. The main committee must approve the personnel of each sectional committee as being authoritative and adequately representative of the various interests concerned.

Each sectional committee is organized by, and is under the leadership of, one or more of the principal bodies interested. Such bodies are known as "sponsors." The committee has decided that if it is the desire of any industry to have a general committee, representative of the industry as a whole, as a means of developing and correlating the standardization work of the industry that arrangement will be eminently satisfactory.

As to publication of the standards, individual standards are published by the sponsor bodies, but provision is made for the publication collectively of standards approved by the committee and also for the original publication of individual standards upon request or approval of the sponsor bodies. The committee acts as distributing agent for all standards approved by it, or which have been submitted to it for approval.

At present the work is supported by the dues of the member bodies, $500 for each representative on the main committee. Exception is made in the case of government departments, pending the enactment by Congress of legislation which is necessary to enable the departments to contribute their share of the expenses of the committee. As the present dues are not sufficient to support and develop the work the committee will seek contributions from industrial associations and companies interested in standardization.

It is planned that the committee office shall serve as a bureau of information on engineering standardization, keeping in touch with what is going on in connection with this subject, both in America and abroad.

The American Society of Mechanical Engineers is engaged upon a revision and enlargement of its power test codes issued in 1915. Nineteen codes are being drafted to cover all classes of power plant machinery. Nineteen committees are engaged, supervised by a main committee of twenty-eight, of which Fred R. Low of New York, editor of *Power*, is chairman, and Prof. Clifford B. LePage of Stevens Institute of Technology, Hoboken, is secretary.

Why Alter the Standard Safety-Car Design?

Advantages and Disadvantages of Double-Door Type of Construction with Longer Platforms Are Discussed and Data Are Given Regarding Power Consumption and Passenger Interchange Time.

BY J. C. THIRLWALL

Railway and Traction Engineering Department, General Electric Company, Schenectady, N. Y.

A NUMBER of articles and letters have recently appeared in the ELECTRIC RAILWAY JOURNAL discussing at considerable length the desirability of changes in the design of the standard safety cars. Some operators seem to feel that double doors, permitting simultaneous entrance and exit, are necessary, and that a wider aisle is desirable. Apparently the thought behind these suggestions is that the use of a double-door car with bigger platform and aisle space will result in a better schedule through a shortening of the time of passenger interchange. Other operators vigorously dispute this claim, including one, at least, who has made the experiment, and who now uses but one of the two doors with which his one-man cars are equipped.

There is unquestionably a feeling of irritation produced in the minds of passengers waiting to board a car, if they are held up twenty or thirty seconds while fifteen or twenty people are leaving a single-door car, particularly in rainy weather, and actual complaints from such people or the fear that such complaints would occur have without doubt influenced those operators who have insisted on changes in the standard design and dimensions. For points of heavy interchange, particularly on streets where several lines operate in common and headways are extremely short, the theory of the simultaneous egress and entrance of passengers is alluring, and the temptation is strong to increase the standing space so as more comfortably to handle rush-hour crowds. But the actual effect of such changes, in spite of the Madison experience, is problematical, and they do involve penalties which are not at all problematical.

INCREASED WEIGHT WILL REQUIRE LARGER MOTORS

The essential features of the original Birney design were the dimensions of the body, the use of a low-wheel, long wheelbase truck, and the elimination of every pound of unnecessary weight. Some strengthening of structural parts was found desirable after the first cars had been tried out in service. Northern cities had to use more heaters than those in the South, and more interior sheathing, and required 26-in. wheels instead of 24-in. wheels to provide winter clearances. But minor changes such as these have not altered the fundamental design, although they have increased the weight considerably above what it was at first, and that thereby increased first costs and decreased the schedule possibilities. But the car builders can still build in quantity for stock and give the industry the benefit of the economies of production.

But if the car bodies are to be lengthened and widened to varying degrees, the trucks may have to be changed to conform and weights may easily increase to a point where larger-size motors will be required to meet heavy service in the larger cities. Under these conditions, standardization and quantity production will be impossible; prices will inevitably increase, and the sale of cars on car trust certificates will be impracticable.

So much for the general objections to fundamental changes; now for the specific ones. According to the article in the March 12, 1921, issue of the ELECTRIC RAILWAY JOURNAL, the double-door cars in Madison weigh 2,600 lb. more than the standard cars originally used there, and it costs real money to carry around this extra weight. Energy consumption goes up almost in direct proportion to the tons moved, maintenance of equipment and of track are both increased and where we used to say "5 cents per pound per year," we can today say that for many roads it costs 10 cents a year for every pound of weight in their regularly used cars.

Of these items, power is the largest and the one that can be figured the closest. Data recently compiled by the American Electric Railway Association giving statistics on power costs from representative railway power stations show that for ten large plants ranging from 15,000 to 87,000 kw. in capacity the average operating cost per kilowatt-hour is 1.08 cents. Twelve smaller stations of from 4,500 to 13,000-kw. capacity show an average cost of 1.62 cents. These figures do not include fixed charges.

Repeated tests of safety cars in frequent-stop city service indicate an average motive-power consumption of 140 watt-hours per ton mile (including passenger load) at the car, or about 200 watt-hours at the alternating-current switchboard in the power station. Figures compiled by the writer, and presented in an article published in the Oct. 2, 1920, issue of the ELECTRIC RAILWAY JOURNAL, covering 1,255 safety cars operated by thirty-eight railways, showed an average annual mileage per car owned of 42,500. The annual energy consumption, on this mileage figure, per ton of weight would be 0.2 × 42,500 or 8,500 kw.-hr., or 4.25 kw.-hr. per pound. At the lower cost in the above figures, each pound of weight in the cars costs 4.6 cents per year for power; at the higher rate, which is nearer the average, I believe, it costs 6.8 cents per pound per year.

The effect of weight on track and equipment maintenance is more difficult to determine. Obviously with light cars, the special trackwork, rails and joints will last longer and tie spacing can be increased, and, with any given truck and motors, the lighter the body the longer the life of wheels, axles, truck members, brake shoes and motor insulation. The longer and wider the body, the more it costs to repaint it and to make the ordinary running repairs.

OPERATING COSTS ANALYZED

We know fairly accurately the average operating costs of the standard safety cars. Twelve companies operating over 400 safety cars averaged in 1920 1.6 cents per car-mile on their safety-car lines for maintenance of way and structure, and for equipment maintenance, 1.7 cents. Of the first figure, probably at least one-fourth, or 0.4 cent, covers items that would be directly affected by car weights; of the latter, fully one-half, or 0.85 cent, would be affected by the weight and size of body. The total of these items, or 1.25 cents, is the weight factor per car-mile of the standard safety cars on these twelve properties. The weight of these cars with average load is about 17,000 lb., so that with an annual mileage of 42,500, as previously assumed, the cost per pound is (1.25 × 42,500) ÷ 17,000 = 3.1 cents. This cost, of course, will vary, depending on many factors, but probably on few roads would it be less than 2 cents, while on many it would be 4 cents.

The total cost, therefore, for power and maintenance is at least 7 cents per pound per year, and may be 10 cents. A fair average would be about 8.5 cents; so the 2,600 lb. of additional weight will add about $200 a year to the operating costs. Fixed charges on the $600 extra first cost of the car will add another $100 annually, making the total penalty $300 on an average.

If a materially faster schedule could be made as a result of these changes, this extra cost might be justified, but the man who expects such a result is very apt to be disappointed. The following records have been published during the past four months by the American Electric Railway Association, comparing speed of passenger interchange on safety cars and on two-man prepayment types:

	Seconds per Passenger Interchange	
	Two-man Cars	Safety Cars
Denver, Col	2.75	....
Baltimore, Md	2.31	2.64
San Antonio, Tex	2.93	3.14
Charleston, S. C	2.60	3.40
Portland, Ore	2.97	3.61
Trenton, N. J	1.70	1.84
Average	2.54	2.93

The records above were all taken by the operating companies, excepting those in Trention, which were made by inspectors of the New Jersey Public Utilities Commission. They show an average difference per passenger of but 0.4 second in favor of the double-door, two-man cars, or a total of 0.8 second per passenger per trip. In other words, in handling seventy-five passengers per hour, the total duration of stops would be only one minute longer than on a two-door, two-man car. But certainly a part of this extra time is due to one-man operation rather than to interference between entering and leaving passengers. As a matter of fact, the Public Utilities Commission report on safety-car operation in Trenton indicates that only about 5 per cent of the total time of passenger stops was occasioned by passengers leaving when others were waiting to board the car. Every one familiar with traffic conditions knows that at most stops passengers board or passengers alight, but there is no interchange, or simultaneous boarding and alighting. So it is safe to say that of the one minute per hour excess time of the safety car, not more than 15 or 20 seconds could possibly be saved by a double door of wider aisle. And, further, the extra weight of these features slows down the free-running speed of the car and decreases the rate of acceleration to such an extent that the resulting schedule speed is much more apt to be reduced than increased. With the present size motors, a 15,000-lb. car with a fifty-passenger load can be safely accelerated at only about 1.5 m.p.h.p.s., the minimum rate for normal schedules. Cars weighing 17,200 to 17,500 lb., as do the Madison and Lancaster cars, or 19,000 lb. as do those in Logansport, must either accelerate more slowly than is desirable or must overload the motors, with consequent increase in maintenance cost and failures, and if still heavier passenger loads are permitted, as often occurs, this condition is still further aggravated. In other words, for general service and normal schedules in the larger cities, the standard safety car weight is about as great as the present 25-hp. motors are capable of handling; any further increase in body weights will, in many cases, call for larger motors with a material increase in first cost, and in total weight of car.

Therefore, in so far as expediting the handling of traffic is concerned, there would be no advantage in changing the present body dimensions or seating arrangement. There may be in some localities a prejudice against one-man operation, or against single-truck cars, that leads to criticisms of the loading arrangement and aisle width of the standard safety car, and which can be placated by the suggested changes. But it must be remembered that in the past five years there have been built and put into service some 4,000 one-man cars of the Birney design, and fewer than 100 that have had the changes previously discussed, and in only one case has a company previously using the standard car found it necessary to make the changes in subsequent purchases.

Economical Painting for Safety Cars

A Three-Coat System of Painting Has Been Worked Out for the Safety Cars in Trenton, N. J., Which Apparently Has a Satisfactory Life and at the Same Time a Low First Cost

By H. E. Krouse
Master Mechanic Trenton & Mercer County Traction Corporation, Trenton, N. J.

After several experiments the officials of the Trenton & Mercer County Traction Corporation feel that they have solved their problems for refinishing twenty one-man safety cars which that company has in service. The system adopted reduces to a minimum the shopping time, as well as the necessary labor and material, and based on the results of an inspection of cars which have now been in service for the past six months it appears that a satisfactory life will be obtained at a very low first cost.

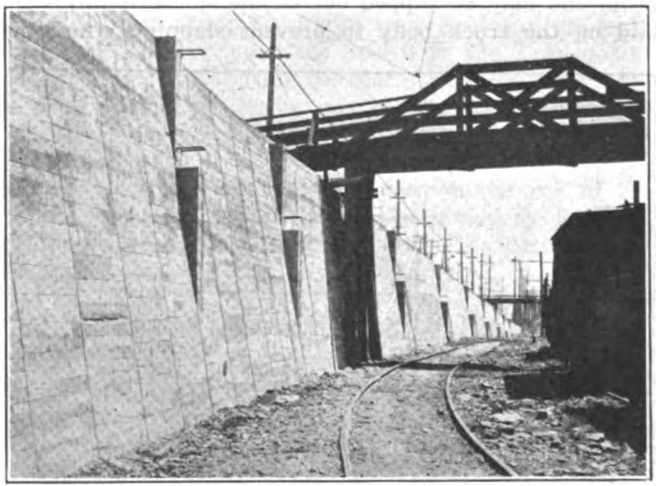
The painting system that is now being used consists of first scrubbing the car body with soft soap and water and then sanding it down. No extensive priming coat is used, but the spots of the car at points where the paint is entirely gone is covered with a metal primer. A coat of lead, tinted to correspond closely to the general car colors, is next applied. This actually constitutes the first coat and is the preparation coat for receiving the finishing enamel. Next a coat of long oil finishing enamel is applied and the numbering, striping and lettering are then completed. Striping has been almost entirely eliminated. The final coat consists of finishing varnish, which is applied over the enamel.

The application of this last coat of varnish over the oil enamel having a semi-gloss is somewhat of a departure from the established practice of this road, and is not considered a necessity. However, it has been found through a test covering ten months of service that by adding a coat of high-grade finishing varnish over the enamel where this short system of painting is used the general condition of the car is improved and a much longer service is obtained. By the use of this three-coat system the shopping time of cars has been reduced from one-third to one-half of that originally found necessary, and a substantial saving in both material and labor has been effected. Results thus far have been so satisfactory with this system that plans are being made to refinish forty more cars of the one-man type and ten 44-ft. steel cars of another type with this method in connection with the painting schedule for the coming year. Railways are practicing economies in all directions during these times of high prices and painting offers a fruitful field for economical methods.

Trolley Pole Support Built Into Retaining Wall

To provide permanent and substantial supports for trolley poles along the Army Street retaining wall in San Francisco the city built into the wall at the time of its construction concrete steps and steel bar loops as shown in the accompanying illustration. The poles carry telephone wires, feeders and the trolley wire for tracks of the United Railroads in the street behind the retaining wall.

The steps built to support the poles are 2 ft. wide and 1 ft. 4 in. in length. The bars are 1¼ in. in diameter, the first one located 1 ft. above the step and the second 6½ ft. above it, or 6 in. below the top of the riser or shoulder of concrete that extends vertically above the step. The 1¼-in. bars extend almost through the retaining wall and hook into a grillage of reinforcing bars in a vertical plane. The loops are 13 in. square inside. When the pole has been placed it is wedged firmly against the concrete by shims driven in around the loops.



STEPS AND LOOPS FOR SUPPORTING TROLLEY POLES

"Through Bolt" Housings

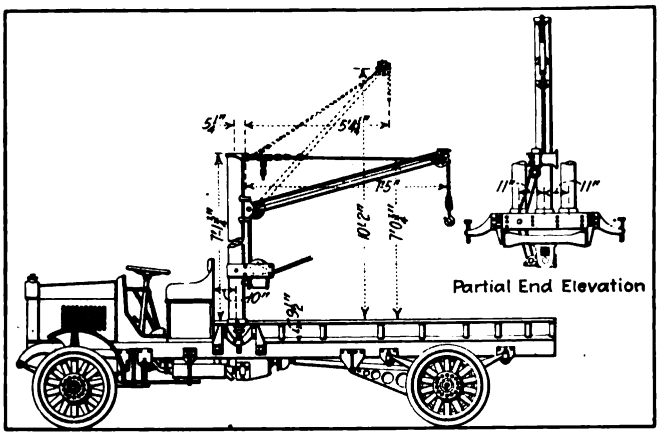
Loose housings have been the source of many of the troubles experienced with split frame railway motors. Early motors were built with housings held in the frame by tap bolts which screwed into tapped holes in the housing. Considerable trouble was experienced with these housings due primarily to the stretching of bolts holding the frame together. This caused the clamping action on the housings to be released and resulted in loose housings. The loose housings caused the tap bolts to work loose in the tapped holes. This condition was difficult to remedy and the repair could be only temporary.

Recently, the split frame motors of the Westinghouse Electric & Manufacturing Company have been so designed that the housing is fastened to the frame by through bolts, which are held tight by steel nuts. When the nuts wear loose, the remedy is simple and inexpensive: throw the nut away and use a new one. The old housing is known as the "tap bolt" type, while the new design is termed a "through bolt" housing. Through bolt housings have been supplied not only on the more recent designs of split-frame railway motors but also to replace the tap bolt housings on many of the older motors.

When the housing seat is badly worn, it has been found that the most satisfactory way to repair is to rebore the frame to a larger size and supply a housing to suit. The Westinghouse company has also developed an "oversize" housing in order to care for this method of repair.

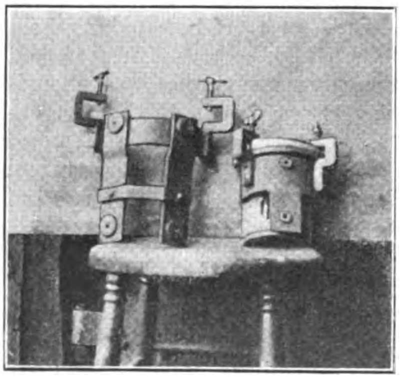
Truck Crane to Reduce Loading Time

THE Meade-Morrison Manufacturing Company, East Boston, Mass., is marketing a truck crane of 1-ton capacity which may be applied readily to any standard truck. The equipment consists of an upright steel column, a boom with fastenings, a base with cross channels, outrigger leveling screws and a winch with brackets. When the chain has been unshackled, the boom end may be slipped out of the slot and the boom laid on the truck body to prevent slapping when the truck is in motion. If it is desired to use the truck on work not requiring a winch the mast or column may be unpinned and lifted out of the base castings and the entire base may be covered by temporary flooring. With the column and winch in the usual position, loads may be pulled up over the rear of the truck by direct pull from the winch, without the use of the boom.



REMOVABLE TRUCK CRANE

Jig Facilitates Drilling of Bearings

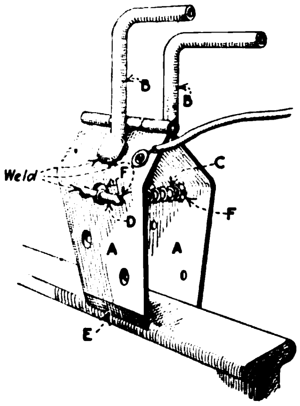


BEARING JIGS FOR LOCATING DOWEL PIN HOLES

THE accompanying picture shows a jig used in the shops of the Des Moines (Iowa) City Railway for locating the dowel pin holes in axle bearings. The bearing to be drilled is merely tightened up in the jig with the two screws shown and a drill run down through the holes provided in the jig. This scheme assures the accurate location of the dowel pin holes and the jig may be placed in position and removed very quickly. It is necessary to have a different jig for each class of bearings, and care must be taken to see that the jigs are made to fit perfect bearings to start with, otherwise inaccuracies result.

Handy Ground Clamp for Electric Welding

THE accompanying illustration shows a form of ground clamp used by the Easton Transit Company for attaching ground wires to electric welders, grinders and other apparatus used on the lines. It has been found of great convenience and its simple construction makes it available for use by any railway.



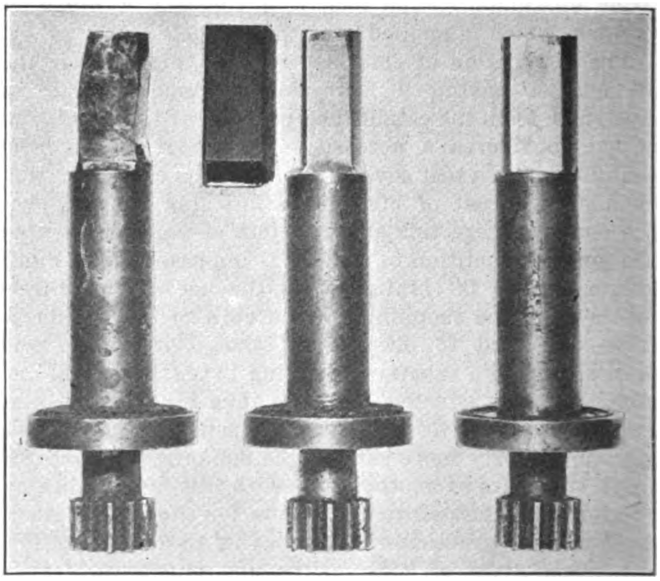
GROUND CLAMP MADE FROM HINGE

The clamp is made from an ordinary strap hinge bent as shown. Two ¾-in. holes are drilled at *F*, and a K-10 controller spring is passed through these and is held in place by two ⅜-in. rods welded in place. The ends of the hinge are cut off and sharpened at *E* and suitable handles made of ⅜-in. iron pipe are shaped and welded to the upper portion of the hinge. If it is desired to insulate these handles a piece of rubber hose may be slipped over them. The wire which forms the electrical connection is attached to the hinge by a ¼-in. stove bolt and washer.

This form of clamp can be quickly applied to and removed from almost any part of the track or special work, and it has been found especially valuable in paved streets, as its construction permits of its use in a very small crevice along the rail. When not in use the clamp is used to hold the coils of line or ground wire to some part of the machine and it thus helps to stow away the wire in good condition.

Steel Sleeves for Broached Shafts

THE use of drawn steel sleeves in repairing the handle fits of controller shafts and brake valve stems enables this work to be done at a very small percentage of the cost that new parts would cost. D. B. Flower, distributer of electric railway accessories, Philadelphia, is furnishing steel sleeves in any size necessary to fit the various broaches of controller handles and brake valve handles. The method of repairing



REPAIRING WORN BROACH FITS WITH STEEL TUBING the worn fits is shown in the accompanying illustration. The illustration at the left shows a worn stem before repairs have been started. This is machined, as shown in the center illustration, to such a size that the steel tubing will form a tight fit when forced on to the stem. The illustration at the right shows the completed job.

Letter to the Editors

Labor Bureau Statistics Are Weighted

CITY OF PHILADELPHIA
DEPARTMENT OF CITY TRANSIT, VALUATION DIVISION
PHILADELPHIA, PA., April 5, 1921.

To the Editors:

I note on page 629 of your issue of April 2, a statement that the index price of the U. S. Bureau of Labor statistics is an unweighted average.

You will find by referring to the U. S. Monthly Labor Review or to Bulletin No. 226 or No. 269 of the Labor Department that this index price is weighted in accordance with the census statistics for each important commodity. The bureau states very clearly that the index number assigns "to each commodity an influence proportioned to its importance in the country's markets."

The best statisticians regard the Bureau of Labor index prices as the best weighted and most generally satisfactory of any available in this country, and in view of the widespread public interest today in index prices and index wages, the writer ventures to suggest that you publish this correction in an early issue.

E. E. GEORGE.

[EDITORS' NOTE.—Mr. George's letter was submitted to J. F. Layng, the author of the article referred to, who has explained that Mr. George is correct as to the weighted character of the data given in the reports of the Bureau of Labor Statistics. The reference made by Mr. Layng to non-weighting was due to the statement, included in earlier bulletins, to the effect that products were so selected as to be "self-weighting." Later reports have been based on weighted data.]

Association News

Building and Structures Committee Meets at Columbus

THE Engineering Association buildings and structures committee met at the Deschler Hotel, Columbus, Ohio, on April 2, 1921. Those present were D. E. Crouse, Rochester & Syracuse Railroad, chairman; N. E. Drexler, Newport News & Hampton Railway, Gas & Electric Company; J. R. McKay, Indiana Service Corporation, and S. J. Steiner, Aurora, Elgin & Chicago Railroad.

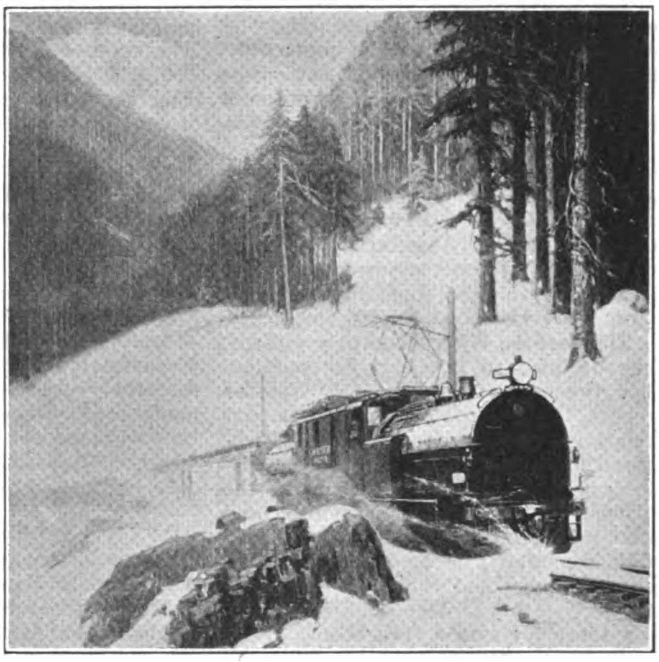
The subcommittee on the design of a typical shop building reported the results of its two meetings with the equipment committee's subcommittee on this subject, and the various details of shop equipment layout and building were thoroughly discussed. The chairman of this subcommittee will have a tentative shop layout and plan ready to present at the next equipment committee meeting, scheduled to be held early in May.

The subcommittee which is co-operating with the way committee on the subject of wood preservation discussed this subject as it relates to the treatment of structural timber and piling and also presented data and photographs of treated timber, indicating the value of preservative treatment. A joint questionnaire on this subject has been issued and the subcommittee will make a further report after studying and summarizing the replies.

In connection with the subject of prepayment and postpayment fare collection at terminals, many plans for both were studied. Plans were laid for an early subcommittee meeting to be held with the Transportation & Traffic Association, so that a form of letter may be drafted to obtain from member companies information regarding this form of fare collection.

More than 125 members are now on the roll of the Camden company section of the Public Service Railway, an increase of more than 100 since the organization meeting.

Milwaukee Locomotive in Fine Art



OIL PAINTING BY SCHENECTADY ARTIST RECENTLY FEATURED IN ART EXHIBITION IN NEW YORK CITY

AN OIL painting of a winter scene on the Cascade division of the Chicago, Milwaukee & St. Paul Railroad, featuring one of the new General Electric passenger locomotives, was shown at a recent exhibition of the National Art Club in New York Ctiy. The painting is by Walter L. Greene of Schenectady, N. Y., the artist who painted the picture of the United States battleship *New Mexico*, recently presented to the Navy Department by E. W. Rice, Jr., president of the General Electric Company.

Mr. Greene is an American by birth, but secured his advanced art training in France and has exhibited at French and Belgian salons, as well as in this country. He is a member of the Boston Art Club.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Blanket Franchise Urged

Railway at Richmond Regards This as Necessary to Carry Out New Financing

The Virginia Railway & Power Company announces the following result of the recent valuation of its Richmond lines made by Stone & Webster as a basis for discussion of a proposed new franchise:

Money put into Richmond Railway system, including interest, less actual return	$20,249,400
Value of property, based on inventory, at average prices of 1914-1920	12,488,841
Difference	$ 7,760,559

The company is asking a return only on the inventory value in the proposed new franchise now pending before the committee on streets of the City Council.

The above relates to railway property entirely and does not include property in Richmond operated under the company's light and power franchise.

E. Randolph Williams, vice-president and general counsel, recently made public the total value of the property of the company as computed by Stone & Webster as of June, 1920. In an address before the Richmond Chapter of the American Association of Engineers Mr. Williams asserted that the entire Virginia holdings of the company were valued at $49,000,000.

Thomas S. Wheelwright, president, has declined to give out for publication the text of the Stone & Webster report, though an abstract of that part relating to the railway lines in Richmond is being used before the committee on streets in connection with the discussions of a new franchise, and that part relating to the lines in Norfolk is similarly being used before the city manager and commission of that city in relation to discussion also pending there for a new franchise.

The company operates now under a number of franchises. Of the two base franchises in Richmond that granted to the Richmond Traction Company expires in 1926 and that granted to the old Richmond Railway & Electric Company expires in 1929. With one of its important base franchises now having less than five years to run, the company is finding it difficult to raise money for needed improvements and extensions and is pressing consideration of a new blanket franchise for Richmond.

Officials of the company have informed Mayor Ainslie that while the road is making some money at the present 6-cent fare, the lack of any credit makes it necessary to pay for all improvements out of earnings, and for that reason track replacement where streets are to be paved can only proceed as the company can afford to pay for the work from its daily earnings.

Wage Cut Results in One-Day Strike

Employees of the Orange County Traction Company, Newburgh, N. Y., have accepted a reduction in wages, but not until the road had been tied up for a day by a strike. The company had a contract with its men expiring on May 1 at the following rates of pay: one-man operators, 53 cents an hour and two-man work, 48 cents an hour. In conferences with the men officers of the company advised that it was necessary for the next year that wages be lowered 10 per cent, and that the rates for one-man operators would be 48 cents an hour and two-man 43 cents an hour. The men were told that these rates would be effective from April 10. The men insisted on retaining the old rate of pay for the succeeding year, and refused to operate the cars on April 10 at the new rate. In consequence the company operated no cars on that day. Through the intervention of Major McKay, City Manager, several conferences were held between officials of the company and its employees and settlement was made at the following rate: 43 cents an hour for two-man work and 50 cents an hour for one-man work. A straight decrease of 10 per cent was made on all other departments. Service was suspended only one day.

Present Columbus Wages Continued

No reduction will be made in the wages of employees of the Columbus Railway, Power & Light Company, Columbus, Ohio, although the agreement expired on March 31 that was reached through the board of arbitration after the strike of 1919.

The announcement that no cut in wages is contemplated was made by Norman McD. Crawford, vice-president of the company. The statement issued by Mr. Crawford shows that the payroll for the year 1920 exceeded $4,500,000. The statement declares:

> Facing as we are a nation-wide business depression and the knowledge that, without exception, all business interests are either reducing wages or reducing forces, or both, it must be evident to you that this company cannot continue to be the exception unless we are able to face the prevailing condition with each individual achieving maximum efficiency, not only in production but also in loyalty united with watchfulness in the interest of the company, and undivided determination to achieve 100 per cent efficiency.

Utility Bill Protested

Ohio Companies Contend Governor's Proposal Would Make Figureheads of Commissioners

Public utilities corporations of Ohio are up in arms over the administrative reorganization bill, sponsored and submitted by Governor Davis and now pending in the General Assembly. They object to the reorganization scheme as it applies to the State Public Utilities Commission and its proposed future status. The House passed the bill and messaged it to the Senate.

PROGRAM PROTECTED

Spokesmen for the steam and electric railways and the power and light companies appeared before the Senate reorganization committee during the week ended April 2, and made emphatic protest against the provision transferring the executive work of the State Public Utilities Commission from it to the director of the proposed department of commerce. They told the committee that this change will make the utilities commissioners mere figureheads and will center too much power in the hands of the Governor, who is to name the director of this and other proposed departments.

A strong plea was made that the bill be amended to allow the commission to retain the power and authority to name all its experts and other officials. As the bill was prepared by the Governor's experts all control over the executive department of the commission is taken away and the commissioners are merely retained to exercise quasi-judicial powers, and to pass on rate cases.

As the result of the protests lodged with the committee by the representatives of the utilities the committee has incorporated amendments which make concessions, but do not accede to the wish of the corporations that the utilities commission be left in its present status and with its present powers.

AMENDMENT TO BILL URGED

The amendments, instead of taking away all the administrative powers of the commission and its right to name its subordinates, provide that the director of commerce shall serve as secretary to the commission. It is hoped that this change will meet with the approval of the public utilities companies.

It was expected that the reorganzation bill would come up for passage during the week ended April 9, after which, in the event the Senate passes the measure it must be sent back to the House for concurrence by that body.

New Orleans Conference

City Insisted on $35,000,000 Valuation for Railway—Bankers Dismayed at Prospects

A very important executive conference attended by J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, Judge Rufus E. Foster of the United States District Court, and visiting Eastern Bankers was held at New Orleans on April 6 in order to map out a definite plan for the solution of the traction troubles of New Orleans.

The Mayor appears to be inflexible in his determination to adhere to the plan of the City Council setting forth fourteen points which it regards as essential for acceptance by the company if the matter is to be settled. One of these fixes the valuation of the property at not more than $35,000,000, with a yearly return of $2,150,000, and allowing a further increase in the valuation of $5,000,000 for new money. On this new money a return of 7½ per cent would be allowed, whereas the return on the valuation the city is willing to allow would be 6.14 per cent.

Other conditions covered are that the Commission Council shall approve all undivided profits and securities issued, and that salaries shall be limited, track standardized, etc.

Mr. Dahl, one of the visiting financiers, had consented to accept the property valuation of $44,700,000 placed upon it by the citizens' advisory committee and a rate of return of 7 per cent. He announced on behalf of himself and the visiting bankers, when the proposed plan was submitted by the acting Mayor, that further negotiations were useless. The conference thereupon came to an abrupt end. This valuation of $44,700,000 had been approved by Receiver O'Keefe and Judge Foster.

Harold W. Newman, president of the New Orleans Stock Exchange, a member of the committee, in speaking of the decision reached by the City Commissioners, declared that the "fourteen" points are so inconceivable as to destroy the banking credit of the company.

If the Council passes the 7½-cent ticket ordinance, Receiver O'Keefe said he would refuse to accept that fare and warned the public that if the rate of fare was made to revert to 5 cents the street cars would not be taken out.

Service-at-Cost Legislation Approved

Upon recommendation of its legislative committee the Milwaukee City Council at its meeting on April 4 approved a bill to be introduced in the State Legislature authorizing the city to enter into a service-at-cost agreement with the Milwaukee Electric Railway & Light Company. The legislation has been asked by the public-utilities acquisition committee, appointed to investigate the feasibility and desirability of municipal ownership of the electric railway and electric light and power facilities of Milwaukee.

The bill is intended to give the city of Milwaukee power to carry out the recommendations which the public utilities acquisition committee is expected to make in a report to be submitted in the very near future. The bill provides for the usual service-at-cost agreement plus a feature which will make it possible for the city gradually to become the owner of the utility property. The company, under the proposed service-at-cost agreement, would be removed from the jurisdiction of the State Railroad Commission except in certain minor matters. Under the plan the city will also extend its credit to the company to finance extensions and improvements at a lower rate of interest than the company now has to pay.

Operating Proposal Transmitted to Council

Mayor Moore of Philadelphia, Pa., has transmitted to City Council the proposed form of agreement providing for the leasing of the city-owned Frankford Elevated Railway and Bustleton lines to the Philadelphia Rapid Transit Company for operation. Accompanying the draft of the proposed agreement was a message from the Mayor to Council, giving an outline of its provisions. It was referred without debate to the committee on transportation. Among the more important terms of the lease are these:

The Rapid Transit Company is to operate the lines and pay the city annually a return of 5 per cent on the amount invested in the property, which now amounts to about $15,000,000.

The lease is to expire July 1, 1957. There is, however, also a provision that the lease "shall absolutely cease and determine without further notice six months after the date of the final adjudication of the valuation of the properties operated by the company, including the lines leased hereunder now pending before the Public Service Commission."

The city also reserves the right at any time after five years from the date of the agreement, during the term of the agreement, to terminate it after giving the company six months' notice.

The company is to supply two of the three power stations and to equip and operate the Bustleton surface line.

The company is required to furnish "safe and reasonably adequate accommodations to the public."

The city is to supply a maximum of 100 cars (50 of these have already been ordered). It shall also supply a substation of about 4,000 kw. capacity, located at Front Street and Fairmount Avenue.

The company is to be liable for any damage claims, excepting such as result from any defect in the property that may exist prior to May 1.

The payment of rentals to the city is to have precedence over the payment of dividends on Philadephia Rapid Transit stock.

Buffalo Cuts Wages

All Unskilled Labor Included in Retrenchment — One-Man Car Operators Only Trainmen Included

Reductions in basic wages affecting all classes of unskilled employees except platform men are announced by the International Railway, Buffalo, N. Y., effective on May 1. The pay of unskilled laborers, boosted during the war by the War Labor Board to an abnormal sum as compared with wages of skilled employees, will be equalized by the new scale announced by President Herbert G. Tulley.

In a statement to employees explaining the new scale, President Tulley says that for the year 1920 the company fell short by more than $1,000,000 of earning a fair return upon the value of its property devoted to public service, according to the formula adopted by the Public Service Commission when the 7-cent fare, with four tickets for a quarter was granted.

The situation as far as 1921 is concerned is even worse, Mr. Tulley says, with the result that for the months of January and February the company failed by $300,000 to earn the amount required. This is occasioned by the industrial depression, which has been so acute that at the present time the gross receipts show a falling off of 17 per cent. Mr. Tulley said:

> At this time the management does not intend to change the basic rate of its motormen and conductors, or of its skilled employees. The abnormal rates of wage paid some classes of unskilled employees must be adjusted and certain costly working conditions must be corrected. The maximum rate of trainmen has been increased 75 per cent since May 31, 1918, while wages of certain classes of unskilled employees, such as curve cleaners, watchmen, bridgemen, helpers, car cleaners, etc., have been increased an average of 100 per cent and in some cases as high as 200 per cent.

$100,000 PAID FOR UNPRODUCTIVE TIME

President Tulley points out that last year the International paid to trainmen more than $100,000 for time during which no work was performed, exclusive of layover time. He says that "payments for which no service is rendered cannot be justified and cannot be continued, consequently a new set of working conditions eliminating such payments will become effective on May 1, 1921. Compensation for loss of time when taking the nine hours' rest period will be discontinued under the new rules and only such guarantees, allowances or special compensations as are provided in the new working conditions will be paid after May 1."

The local lines of the International in the city of Lockport last year did not earn operating expenses. Under these circumstances President Tulley explains that the company is not justified in continuing payment of the 5 cents extra compensation for the operation of one-man cars in that city. Effective May 1, trainmen in Lockport will be paid the same scale as those in Buffalo, 55, 58 and 60 cents an hour.

"The rates of pay of all other employees except those listed will for the present be continued unchanged," the statement says.

The International Railway says it makes no guarantee of the continuance of these rates for unskilled workers and that its ability to maintain them is dependent upon an improvement in the revenue of the company and the extent to which the employees co-operate with the management in its efforts to operate the property efficiently and economically.

The changes in rates per hour effective May 1 are as follows:

Auto washers, 40 cents an hour.
Bridge agents, 45 cents an hour.
Car cleaners, 40 cents an hour.
Car cleaners foreman, 45 cents an hour.
Curve cleaners, 40 cents an hour.
Drillhands, 50 cents an hour.
Firemen shops and carhouses, 40 cents an hour.
Freight truckers, 45 cents an hour.
Helpers, mechanical department (all classes), 45 cents an hour.
Janitors, 40 cents an hour.
Laborers, 40 cents an hour.
Sandmen, 40 cents an hour.
Scrubbers (paint shop), 50 cents an hour.
Scrubbers (foreman), 54½ cents an hour.
Shifters, 45 cents an hour.
Stoveman, 40 cents an hour.
Storeroom laborers, 40 cents an hour.
Sweepers, 40 cents an hour.
Watchmen, 40 cents an hour.
Trainmen employed on trolley express, flat and work cars will be paid the same rate as trainmen in the passenger service, viz: 55, 58 and 60 cents an hour.
Trainmen operating "one-man" cars in Lockport, 55, 58 and 60 cents an hour.

City of Chicago Still Obdurate

Checks for a total of $3,590,616 were refused by the city of Chicago on April 9. Tender of this amount was made by the Chicago Surface Lines in payment of the city's share of transportation revenue for the two years preceding Jan. 31, 1921. This is what is known as the city's 55 per cent of net revenue. The city contends that the ordinances under which these payments are made have been abrogated by the companies in allowing rates of fare to be increased. Last year the "55 per cent" amounted to $1,448,848, while this year it totaled $2,138,383. There was also an amount due from the companies in the matter of the adjustment of certain claims.

Mayor Thompson evidently has been forced by public sentiment to accept certain amendments to the transportation measures which are awaiting action by the State Legislature. Radical changes were made in the proposed bill at the last minute, and it will be called up for action in the near future. Originally the Mayor saw insurmountable obstacles in a suggestion that the elevated roads be included in the plan for a "transportation district." It is now intended to make it possible for the city to acquire these properties as part of the general plan.

A more important change is in a provision that the trustees under the act may raise fares above 5 cents in order to cover costs of operation. Other proposed amendments would put all employees of the district except the highest executives under civil service and would call for a referendum on bond issues.

New Wage Draft Presented

Important Changes, Including Wage Reduction, Are Outlined by Eastern Massachusetts Street Railway

The joint conference board of the union of employees of the Eastern Massachusetts Street Railway has been handed a draft of a proposed agreement prepared by the public trustees of the company and has been asked to submit the agreement to the local unions throughout the Bay State System for approval. The company announced on Feb. 25, that it would reduce wages 20 per cent effective May 2, 1921.

The new agreement is to be made for one year beginning May 2, 1921. In it the trustees state that the company will do nothing to prevent any employee from becoming or continuing to be a member of the union and will not in any way discriminate against a member thereof because of such membership.

A new provision of the proposed agreement submitted by the trustees is that all regular employees shall be provided without expense or medical examination, with group life insurance similar to that now enjoyed by the supervisory force. The amounts of this group insurance range from $500 for employees in the service one year to $2,000 for employees in the service for ten years or more. These policies are to be issued to the employees without cost to them.

OLD WAGE SCALE TO BE RESTORED

Wages will be restored to the scale in effect prior to May 1, 1920, namely 46, 48 and 51 cents an hour. Operators of one-man cars will receive 56 cents an hour. Instructors will continue to receive 4 cents an hour in addition to their regular pay. The working day of conductors and motormen and so-called miscellaneous employees will be nine hours. The company will no longer dismiss an employee solely upon complaint of the union that he has violated union rules.

Extra men called for work will continue to receive a guarantee of six hours' wages. The Saturday half-holiday with pay for shop employees is abolished. Time and a half for Sunday and holiday work and overtime to mechanical and miscellaneous employees will be discontinued. Free transportation to employees, whether or not they are in uniform, will be continued.

Seniority rating of regular conductors and motormen will remain unchanged, but work for men on the spare list will be assigned instead of being selected by seniority. Seniority rating of mechanical and miscellaneous employees will be eliminated.

Local discipline cases will be taken up by the manager and labor representatives as in the past and appeal can be made to the public trustees, who will meet one day each month for the purpose of hearing such cases as may be referred to them.

The trustees claim that changes in working conditions and wages provided for in the new agreement are proposed solely to increase efficiency and to help reduce fares.

Arbitration Unavailing in Davenport

State arbitration, tried in Iowa for the first time, has failed to settle the dispute between the trainmen's union and the Tri-City Railway over the discharge of the president of the union for criticising company descipline in a public address.

Following a hearing at Davenport the board, appointed by Governor N. E. Kendall, found "the defendant company was in error, in denying the arbitration of this controversy, under the terms of its contract."

The board, however, did not recommend the reinstatement of the discharged union official, stating this was not within its province. This leaves the controversy just where it was before resort was made to State arbitration.

While the trainmen's union voted to back up its discharged official with a strike, none has been called and the men appear to have let the matter drop.

In the meantime the trainmen are drawing a 70-cent maximum wage held in force by an injunction secured by the Socialist City Attorney of Davenport. There has so far been no disposition on the part of the company to go into court and fight this injunction, probably because the wage scale expires with the old contract on June 1. The Socialist party took sides with the trainmen, when the company notified the latter their wages would be cut from 70 to 40 cents an hour on April 1 and secured an injunction to prevent this cut. Since then an injunction has been employed to prevent the shortening of the bridge line loop, a measure of economy resorted to by the railway.

Future Policy of Detroit United Not Announced

No announcement has been made by the Detroit (Mich.) United Railway as to what action it will take next with respect to the future, in view of the recent defeat of its service-at-cost plan. An early meeting of the directors of the company is scheduled and some action will probably be announced soon after this meeting. Announcement was made by the company prior to the election, however, that no matter what was the outcome of the referendum it would continue to give such service as it was enabled to.

The final count of the ballots cast on April 4 on the two ordinances pertaining to railway matters in Detroit, showed results about as indicated by the preliminary reports based upon counts from a few precincts. The Detroit United Railway's proposed service-at-cost ordinance was voted down, while the city's purchase-plan ordinance was carried with about the same percentage of votes as were cast last year in favor of the bond issue to provide for a municipal system of street railways for the city.

The company's proposition required a 60 per cent affirmative vote, but received only about 36½ per cent. The city's ordinance providing for the purchase of several sections of Detroit United Railway lines received about 65 per cent majority.

Reports from the sections of the city now being served by the new Detroit Municipal Railway lines, which have been in operation since Feb. 1, indicate that municipal ownership was highly indorsed. In some instances in the St. Jean and Charlevoix district, a vote of approximately four to one was reported in favor of the purchase plan ordinance.

Wage Conference Proposed in Salt Lake City

New contracts between the Utah Light & Traction Company, Salt Lake City, Utah, and the Amalgamated Association are being sought by company officials. The present contract, which has to do with hours of work, wages and working conditions, will expire on May 1.

A proposal to reduce the present pay of platform men and carhouse mechanics is anticipated by the union officials, but nothing of this nature was mentioned at the preliminary conference between General Manager Dicke of the company and President Baker of the union. It was said recently, however, that if a wage reduction were sought it might, in some instances, be as much as 20 per cent. Company officials would not discuss the matter other than to say that a request for a conference had been made by it.

The time for holding the conference was designated as April 11.

City Seeks Crossing Rights

Legislation effecting the crossing of privately owned lines by municipally owned railways in Detroit has been introduced in the State Legislature. One bill, the Pitkin bill, is reported as an amendment of the general railroad law which makes no provision for crossings by municipally owned lines. The Pitkin bill provides for the handling of such crossings by the State Public Utilities Commission.

The Copley bill, introduced about a week prior to the Pitkin bill, would give the City Council power to decide questions relative to such crossings.

In discussing the Pitkin bill, David H. Crowley, special counsel for the city of Detroit in street railway matters, who drafted the Copley bill, stated that the former would endanger the success of municipal ownership in Detroit. It would transfer jurisdiction over municipal street railway crossings to an outside body such as the Public Utilities Commission, while such crossings primarily concern the city.

The Copley bill, Mr. Crowley states, gives the commission a limited authority to pass on safety devices for crossings in which a street railway is involved, while the Pitkin bill, if it delegates control of such crossings entirely to the commission, is dangerous to municipal ownership.

Carhouse Changes at Boston

On account of the destruction of two large surface carhouses by recent disastrous fires the Boston (Mass.) Elevated Railway has undertaken extensive repairs and enlargements of two other carhouses to provide the necessary facilities. On Feb. 21 the carhouse at Neponset was burned to the ground, followed by the partial destruction of the Amory Street carhouse on March 4.

To provide for the loss of the Neponset station the so-called Park Street carhouse at Fields corner is being entirely remodeled. The old wooden structures are being demolished and a new brick building is to be constructed in the center of the area with a lobby and office building at one side. The track layout is being revised to accommodate a total of 122 of the largest type cars.

The plan is to establish an up-to-date carhouse of good exterior appearance for the storage inspection and minor repairs of surface cars. The area on the public street sides is to be surrounded by a neat masonry wall, and it is expected that property in the neighborhood will be considerably improved by the removal of the unsightly wooden structures and the construction of the new carhouse and office building. The layout has been worked out on lines similar to those in use in Cleveland and other Middle West cities and will be thoroughly fireproof and modern in every respect.

To take the place of the Amory Street house the old surface car station at Forest Hills, which for some time has been out of use except as a dead storage plant, will be repaired and put into shape for about 100 of the largest cars. It will be put into service as a full operating rating station, with inspection and repair facilities, pits, etc.

Practically all this repair and reconstruction work will be done by the engineers and working forces of the company.

Although a considerable number of old cars were destroyed by the two fires the trustees are not planning any immediate additions to rolling stock except ten one-man cars, on which bids have been asked.

Trainmen Agree to Wage Cut

Motormen and conductors of the North Alabama Traction Company at Albany and Decatur voluntarily agreed to accept a cut of about 5 per cent. in their wage scale in a hearing before the Public Service Commission on April 4 of the petition of the receiver of the company for permission to operate one-man cars on all lines. The proposal was made by Melvin Hutson, attorney for the men, who opposed the receiver's petition. Witnesses for the company testified that the monthly deficit of the company now is about $800. The proposed cut of the employees would save about $250 a month.. If the company is permitted to operate one-man cars the services of eight employees will be dispensed with, which will save the company a little more than $900 a month, and will give an earning of about $100 a month, provided other expenses do not increase.

Cleveland Men Voting

Officials of the union representing the 3,400 motormen and conductors in the employ of the Cleveland (Ohio) Railway Company have offered to accept the 20 per cent reduction in pay effective on May 1 if the company's closed shop agreement with the men is allowed to remain in force. John J. Stanley, president of the railway, has consented to this providing the closed shop agreement is changed sufficiently to permit union members to resign from the union without being forced to quit the company's service. All new men must join the union within sixty days after entering the employ of the company.

The 20 per cent wage reduction will make the wages of the Cleveland men 55 cents an hour for the first three months, 58 cents an hour for the next nine months, and 60 cents an hour thereafter instead of 70-72 and 75 cents an hour.

At mass meetings of the union members on April 13 propositions made by Mr. Stanley were discussed. It was planned to conduct a referendum vote on the propositions among the members on April 15. The proposals upon which the men were to vote are:

1. To accept a 20 per cent wage reduction and the closed shop agreement to remain in effect as at present.

2. To accept a reduction in pay to make the scale 55c. an hour for the first year and 62c. and hour thereafter, the closed shop agreement remaining in effect except for an amendment that will permit members of the Union to resign without being forced to quit the company's service.

3. To arbitrate all points in dispute including the closed shop, questions to be as follows:

Shall the company continue the present closed shop in effect?

Shall compensation for the trainmen be continued as provided by the War Labor Board for night runs, spread runs and Sunday runs?

What shall the new rate of pay be?

In case the men elect to have all points in dispute arbitrated, James H. Vahey, Boston, attorney for the International Union, is to represent the men, while C. Loomis Allen, Syracuse, is to act for the company.

Mr. Stanley and officials of the union have come to a practical agreement regarding other demands of Mr. Stanley for changes in the present clauses inserted by the War Labor Board. This understanding between the union officials and Mr. Stanley calls for the elimination of all extra pay for the spread time runs, continuation of ten hours pay for eight hours night car runs and payment of time and a quarter for work in excess of regular runs instead of time and one-half.

Irregularities Alleged in Connection with Railway Legislation in Massachusetts

A formal investigation has been started by the Massachusetts Legislature of charges of irregularities in connection with the passage of legislation in 1918 and 1919 affecting the Boston (Mass.) Elevated Railway and the Eastern Massachusetts Street Railway. Although there has been constant criticisms of members of the Legislature ever since the passage of the acts establishing the public trustee method of control of these two traction properties, it was not until recently that open charges were made.

During the course of a debate on a bill to have the trustees report on the feasibility of instituting more 5-cent fare lines in Boston, Representatives Hays and Lomasney both openly charged that members of the 1918 Legislature borrowed money from certain Boston trust companies and speculated in railway stock just prior to the passage of the legislation, the inference being that they were thus influenced to vote for the bill which would presumably increase the market value of the railway securities. These charges aroused a great deal of discussion in the press and in the present Legislature with the result that an order was passed for an investigation.

A committee has been appointed consisting of Senators Lyman A. Griswold, chairman, and Walter A. Hardy, Representatives Henry L. Shattuck, James B. Brown and John W. McCormack, none of whom was a member of the 1918 Legislature. It was decided at the start to have no one on the investigating committee who was a member of the Legislature at the time the bills were passed. Subsequently it was decided to investigate the 1919 Legislature, which passed the bill authorizing the Commonwealth to purchase the Cambridge subway from the Boston Elevated Railway.

The State Bank Commissioner has been directed to furnish to the committee the names of all Senators or Representatives in 1918 who had loans in any of the trust companies in Massachusetts which have been closed as a result of financial difficulties. It is also proposed to broaden the scope of the inquiry to require the Boston Elevated Railway to furnish its transfer books and records, and to call upon Boston brokerage firms for a record of their transactions at the time of this particular legislation.

Eight-Hour Bill Defeated.—Senate bill No. 313, in the California Legislature, known as Harris eight-hour bill for electric railway man, was passed out favorably by the labor and capital committee of that body, but was defeated in the Senate on March 31. The first vote was twenty-two to sixteen. The measure was then set over for reconsideration and was defeated on April 9 by vote of twenty-one to eighteen.

News Notes

Attempt to Repeal Utilities Law Fails.—Attempts to abolish the Utility Commission of Tennessee have failed in the present Legislature which has only less than one week to run now before final adjournment.

Electrical Industry Advertised.—A page advertisement appears in *Collier's* for April 9 entitled "Will Your Town Stop or Move Ahead?" It is inserted by the *Electrical World* and points out that during the next four years the electric light and power industry, if it is to keep up with the demands, needs an additional investment of approximately $4,000,000,000. The interest which the public has in the adequate development of the electric light and power companies is pointed out. The advertisement is signed by James H. McGraw, president of the McGraw-Hill Company, Inc.

Municipality to Install Trackless Trolley.—The Board of Estimate of New York City has appropriated $383,200 for extensions, improvements, and operation of municipal trolleys. Of this sum, $83,200 was given to the Staten Island lines to extend service on the Meyers Corners line to Linoleumville and to put into operation a trackless trolley between Schmidt's lane and Seaview Hospital. Of the amount set aside $150,000 will go to purchase sixty used cars to take care of the summer traffic in Staten Island. A similar amount was appropriated for the purchase of one-man cars for the Williamsburg Bridge.

Interurban Reduces Wages.—A reduction in the wages of its trainmen of 17½ per cent and those of linemen trackmen, shopmen and power house men of from 15 to 20 per cent was made on April 1 by the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. This, it is explained, makes a reduction that amounts to approximately one-half of the increases granted since 1918. The wages of the trainmen were reduced from 47 cents to 40 cents an hour, while the wages of the linemen, shopmen, trackmen and power house men, which varied from 35 to 60 cents an hour, were reduced to from 30 cents to 50 cents an hour.

Wage Reduction Talk in Cincinnati.—The Cincinnati (Ohio) Traction Company has notified its stationary firemen it desires to reduce their wages. This is in accordance with the existing contract between the company and the Union. The firemen's contract year ends May 1, that of the engineer's June 1 and of the motormen, conductors and other employees July 1. All would run on from year to year unless modified. It has not been announced how much the company wants the wages of the firemen reduced, but there is a report that it is around 20 per cent. Stationary firemen get 90 cents an hour and regular motormen and conducotrs 59 cents an hour.

Trainmen Accept Wage Cut.—Employees of the Albany Southern Railroad, Hudson, N. Y., have agreed to accept a 10 per cent reduction in wages. General Manager Hewes in a circular letter to the employees issued on April 2 asked them, in view of the reduced earnings of the company, to accept a cut of 10 per cent in their pay. The employees asked for a conference with the general manager. The request was granted and after a discussion of the subject of the company's condition the employees agreed to accept the reduction. The reduction affects motormen, conductors, freight crews, freight handlers and some others. The motormen and conductors were receiving 55 cents an hour.

Programs of Meetings

National Electric Light Association

The National Electric Light Association will hold its forty-fourth annual convention in Chicago from May 31 to June 3, 1921. The business session and meetings of the convention will be held at Hotel Drake.

Mechanical Division of A. R. A.

The general committee of the Mechanical Division of the American Railway Association, at a meeting in New York on March 30, decided to hold a business session at the Hotel Drake, Chicago, on June 15 and 16, instead of the convention that was to have occurred at Atlantic City. The program has been modified and reports will be presented only by the committees on the following subjects: Prices for Labor and Material, Car Construction, Loading Rules, Brake Shoe and Brake Beam Equipment, Train Brake and Signal Equipment, Specifications and Tests for Materials, Tank Cars and Standing Methods of Packing Journal Boxes. Both morning and afternoon sessions will be held.

Chamber of Commerce

The ninth annual meeting of the Chamber of Commerce of the United States will be held at Atlantic City, N. J., April 26 to 29, 1921. The session will begin with a meeting of the national councillors on the afternoon of April 26. Thereafter there will be general sessions in the morning of each day and the afternoon of April 29, with group meetings on the afternoons of April 27 and 28. The groups this year are (1) civic development, (2) domestic distribution, (3) fabricated production, (4) finance, (5) foreign commerce, (6) insurance, (7) national resources production and (8) transportation and communication, including (a) shipping and (b) railroads. The two sections of the transportation group meet separately on Wednesday afternoon but jointly on Thursday afternoon.

Financial and Corporate

Toledo Deficit Increasing

Economies Sought From Wage Readjustment, Revised Power Rates and Car Rerouting

The operating deficit of the Community Traction Company, Toledo, Ohio, for March is expected to be larger than that for February, when it amounted to $58,000. The payments made on April 11 showed a balance of about $37,000 accumulated in the maintenance, depreciation and claims and damage funds to offset the deficit in the stabilizing fund, which has fallen below the $300,000 mark now. Maintenance has been set at 10 cents a car-mile in order to create a surplus for summer work. In the depreciation fund, which may be used for extensions and betterments, there is now a surplus of $14,000.

The wage conference held for the purpose of working out a contract between the Community Traction Company and the carmen's union has dragged along and will probably end in a deadlock. The men have been offered a cut in wages from 60 cents to 58 cents an hour. A vacation of two weeks with pay has also been withdrawn. Electrical workers are also debating the terms of a new agreement and in the meantime the old contract is being extended.

It is thought that action on contracts is being postponed in order to await the decisions of conferences due on May 1 between the men and the railways at Detroit and Cleveland. The Toledo contract has always been one month in advance of the contracts of these two cities, and on a down-scale revision of wages is put in an important position in the bargaining. What step the city might take to protect its equity in the property in event of a strike is problematical. The commissioner and board of control may have something to say about wages to be paid before the matter is definitely settled.

The refusal of Henry L. Doherty to allow city experts to view the books of the Acme Power Company, one of his subsidiary power companies in Toledo, in an effort to fix a reasonable rate for power supplied by the Toledo Railways & Light Company to the Community Traction Company has brought forth a friendly effort from the city officials to bargain with the company. The conferences on power will be taken up soon by Henry Riggs, Ann Arbor; V. B. Phillips, Cleveland, and David Friday, Ann Arbor, who have been secured to determine the rate for the contract. The Acme Power Company has set a rate at 2.35 cents a kilowatt, which the commissioner has disapproved as excessive.

A portion of a rerouting plan suggested to the Council by Commissioner Wilfred E. Cann has passed the Council committee and will without doubt be put into effect in a few weeks. It is a plan to eliminate a portion of one by combining two lines into a one-way belt. The elimination of the Indiana Avenue line as proposed has not had the sanction of the Council as yet. The changing of the Huron and Erie lines and the making of a separate line of Western Avenue will effect a saving estimated at $97,000 a year in the operation of the system here.

Suspension of Service Suggested

Threats to abandon the City Railway line and perhaps the Wheeling & Elm Grove Line, both owned by the Wheeling (W. Va.) Public Service Corporation, were made at a meeting of the City Council by J. D. Whittemore, general manager, following orders from the city to pave between the tracks. Mr. Whittemore said:

> Notwithstanding the revision of the fares effective during December, 1920, the City Railway continues to operate at a deficit, and inasmuch as there appears to be little prospect of relief in sight the directors of the company have voted to call a meeting of its stockholders and to recommend that they take such steps as may be necessary to discontinue the operation of the road and liquidate whatever assets may remain. It is expected that the stockholders of the company will follow this recommendation and that immediate steps will be taken to wind up the affairs of the corporation.
>
> In view of these facts and conditions, I regret to state that it will not be possible for the City Railway to undertake any of the work outlined in your letters.

Buses compete with lines of the Wheeling & Elm Grove Company.

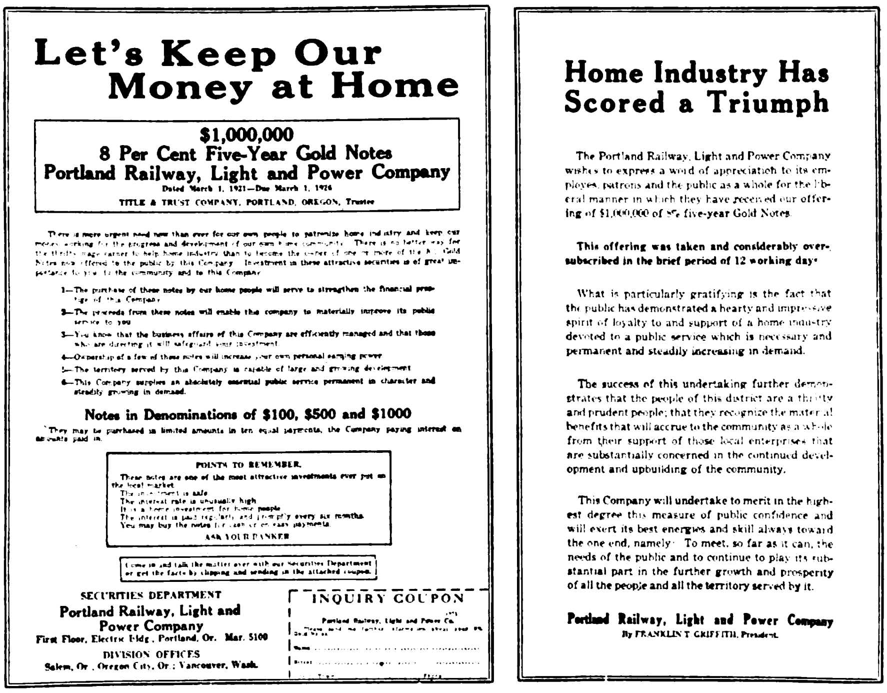
Direct Offering Successful

$1,000,000 of Notes Sold in Twelve Days to Employees, Customers and Public

The Portland Railway, Light & Power Company, Portland, Ore., has sold to its employees, customers and to the public an issue of $1,000,000 of 8 per cent five-year gold notes, the entire offering being disposed of in twelve days, with a considerable oversubscription. This is the first attempt the company has made to dispose of securities since the original preferred and common stock of the company was sold.

The campaign was conducted by the company itself through its employees, but met with whole-hearted co-operation from the many banking institutions located in the Portland territory. These banks disposed of nearly $100,000 of the gold notes purely as an accommodation without a cent of commission for this service.

The selling organization of the company was under the direction of A. C. McMicken, commercial manager of the company. The sales force consisted of about fifteen officials and department heads who acted as "key men." These chairmen recruited their individual committees for selling the notes to the other employees and to the company's patrons. The publicity and advertising in connection with the offering were directed by W. P. Strandborg of the company.



Let's Keep Our Money at Home

$1,000,000
8 Per Cent Five-Year Gold Notes
Portland Railway, Light and Power Company
Dated March 1, 1921—Due March 1, 1926
TITLE & TRUST COMPANY, PORTLAND, OREGON, Trustee

There is more urgent need now than ever for our own people to patronize home industry and keep our money working for the progress and development of our own home community. There is no better way for the thrifty wage earner to help home industry than to become the owner of one or more of the 8% Gold Notes now offered to the public by this Company. Investment in these attractive securities is of great importance to you, to the community and to this Company.

1—The purchase of these notes by our home people will serve to strengthen the financial prestige of this Company.
2—The proceeds from these notes will enable the company to materially improve its public service to you.
3—You know that the business affairs of this Company are efficiently managed and that those who are directing it will safeguard your investment.
4—Ownership of a few of these notes will increase your own personal earning power.
5—The territory served by this Company is capable of large and growing development.
6—This Company supplies an absolutely essential public service permanent in character and steadily growing in demand.

Notes in Denominations of $100, $500 and $1000

They may be purchased in limited amounts in ten equal payments, the Company paying interest on amounts paid in.

POINTS TO REMEMBER.

These notes are one of the most attractive investments ever put on the local market.
The investment is safe.
The interest rate is unusually high.
It is a home investment for home people.
The interest is paid regularly and promptly every six months.
You may buy the notes for cash or on easy payments.
ASK YOUR BANKER

Come in and talk the matter over with our Securities Department or get the facts by clipping and sending in the attached coupon.

SECURITIES DEPARTMENT
Portland Railway, Light and Power Company
First Floor, Electric Bldg., Portland, Or. Mar. 5100
DIVISION OFFICES
Salem, Or.; Oregon City, Or.; Vancouver, Wash.

INQUIRY COUPON
1921
Portland Railway, Light and Power Co.
Please send me further information about your 8% Gold Notes.
Name
Street
Town State

Home Industry Has Scored a Triumph

The Portland Railway, Light and Power Company wishes to express a word of appreciation to its employes, patrons and the public as a whole for the liberal manner in which they have received our offering of $1,000,000 of 8% five-year Gold Notes.

This offering was taken and considerably oversubscribed in the brief period of 12 working days

What is particularly gratifying is the fact that the public has demonstrated a hearty and impressive spirit of loyalty to and support of a home industry devoted to a public service which is necessary and permanent and steadily increasing in demand.

The success of this undertaking further demonstrates that the people of this district are a thrifty and prudent people; that they recognize the material benefits that will accrue to the community as a whole from their support of those local enterprises that are substantially concerned in the continued development and upbuilding of the community.

This Company will undertake to merit in the highest degree this measure of public confidence and will exert its best energies and skill always toward the one end, namely: To meet, so far as it can, the needs of the public and to continue to play its substantial part in the further growth and prosperity of all the people and all the territory served by it.

Portland Railway, Light and Power Company
By FRANKLIN T. GRIFFITH, President.

SPECIMENS OF THE APPEAL AND THE APPRECIATION

The success of the campaign is indicated by the fact that nearly 1,900 out of 2,800 employees of the company subscribed for the notes. The balance of the offering was taken by the public, the total number of individual subscribers being approximately 33,000.

A remarkable feature of the campaign was the fact that approximately

70 per cent of the subscriptions were paid for in actual cash, although the company offered two forms of partial payment subscriptions—one 10 per cent down and 10 per cent a month, and the other 10 per cent down and the balance before April 15. As indicating the wide-spread distribution of the company's notes the largest individual sale was $7,500.

In conjunction with the selling campaign an intensive advertising drive was conducted in which both the educational and selling features of the undertaking were emphasized. The company sent to its 54,000 customers a four-page circular containing a great deal of detailed information about the company's affairs and also about the notes themselves. With this circular went a letter signed by Franklin T. Griffith, president of the company, and an information card with details of the method of applying for the notes.

An "Inquiry Coupon" was attached to the circular and as the requests for further information came in they were tabulated and indexed and followed up by sending out an illustrated folder of eight pages with additional information about the note issue and the service which the company is rendering to the many communities in its territory. In addition to this a series of fifteen display advertisements, quarter page in size, were used in the local daily papers and selected advertisements were used in practically all the publications in the territory that is served by the company.

These display advertisements were supported by two special issues of *Watts Watt*, the official publication of the company distributed on the cars every Friday morning. Attractive car cards were also used as dash signs on all the company's passenger cars for a period of two weeks and window newspapers pointing out attractive investment features of the gold notes were displayed, two in each car.

An important feature of the campaign was the method used in securing the names of prospects. Each of the 2,800 employees of the company was pledged to turn in to the campaign organization a list of three names each day for a period of ten days. This gave the selling force a list of 84,000 persons and these were carefully sifted by removing duplications and eliminating those that were not regarded as favorable prospects, and the balance of the list was turned over to teams of two employees each and personal solicitation was made.

The entire cost of the campaign was substantially less than if the notes had been offered to the public through the regular banking and investment channels. The exact cost of the campaign is not available at this time, but as evidence of the very nominal cost it can be said that the expense for advertising, which was the major part of the cost, was under 0.7 of 1 per cent. The balance of the cost was limited virtually to printing of the forms, blanks and stationery and the necessary postage.

Quebec Company Negotiating Sale.—The Quebec Railway, Light, Heat & Power Company, Quebec, Que., is negotiating for the sale of the Quebec & Montgomery Railway. With the sale of this railway the company will become solely a public utility concern.

Railway Credit Growing Steadily

Notwithstanding Increased Operating Ratio City and Interurban Company's Credit Indicator Increases 10 per Cent

According to an analysis of operations covering 127 electric raliway companies made by E. J. Murphy, statistician of the bureau of information and service of the American Electric Railway Association, the gross income for seventy-two urban companies increased 4.3 per cent, while for fifty-five interurban companies it increased 4.9 per cent over the previous year. Deductions by interurban companies increased 7.9 per cent against 0.15 by urban companies.

EVEN with these increased fixed charges the net income of city companies applicable to dividends increased 42.5 per cent, interurban companies decreased 1.6 per cent, while if combined the weighted average shows a 24.5 per cent gain.

The credit index, that is, the ratio of gross earnings to gross income, also shows improvement. In the case of the urban companies it increased from 4.74 to 5.24, the interurban companies 3.65 to 3.98 while if the totals are combined the index is 4.54 and 5.02 for 1919 and 1920 respectively, a gain of slightly more than 10 per cent.

Deductions from gross income, for fixed charges, are still greater than it should be for a sound financial basis. Improvement has been made by the urban companies. In 1920 this percentage was 87.8, as against 90.3 the previous year. For the interurban companies the opposite is true. In 1920, 70.8 per cent of gross income went to fixed charges while in 1919 the percentage was 68.8.

On a combined basis the operating revenue increased 16.3 per cent and operating expenses 18.9 per cent. The operating ratio increased from 76.8 in 1919 to 78.4 in 1920: The increase in operating expenses seems to have been consistent. For all companies it was 18.9 per cent, for the city companies 18.8 per cent and for interurbans 19.2.

An analysis of the operating accounts shows that notwithstanding this increase the amount spent for each item follows practically the same percentage for the two years, the greatest variation, however, being in the cost of power, with the cost of conducting transportation next. Both of these variations were in the neighborhood of 1 per cent.

TABLE I—COMBINED INCOME STATEMENT OF SEVENTY-TWO CITY AND FIFTY-FIVE INTERURBAN ELECTRIC RAILWAYS FOR THE CALENDAR YEARS 1919 AND 1920

	72 City Companies			55 Interurban Companies			127 City and Interurban Companies		
	1920	1919	Per Cent Increase	1920	1919	Per Cent Increase	1920	1919	Per Cent Increase
Railway operating revenue	$229,629,280	$196,999,477	16.6	$37,724,460	$32,75,494	15.2	$267,353,740	$229,751,971	16.3
Operating expenses:									
Way and structures	$22,625,964	$19,166,412	18.0	$4,818,027	$4,113.560	17.1	$27,443,991	$23,279,972	17.9
Equipment	23,742,679	20,480,766	15.9	3,431,323	3,041,514	12.8	27,174,002	23,522,280	15.5
Power	28,940,898	22,978,675	25.9	5,753,790	4,566,871	25.8	34,694,688	27,545,546	25.9
Conducting transportation	81,972,242	68,629,920	13.8	9,200,254	7,872,619	16.7	91,172,496	76,502,539	18.1
Traffic	688,120	664,679	3.5	250,454	228,596	9.6	938,574	893,275	5.1
General and miscellaneous	23,475,899	20,796,833	12.8	4,912,135	3,969,733	23.7	28,388,034	24,766,566	14
Transportation for Investment. Cr.	113,036	131,085	*13.8*	2,927	1,078	171.5	115,963	132,163	*12.2*
Railway operating expenses	$181,332,766	$152,586,200	18.8	(b) $28,365,448	(a) $23,799,021	19.2	$209,698,214	$176,385,221	18.9
Net operating revenue	48,296,514	44,413,277	8.7	9,359,012	8,953,473	4.5	57,655,526	53,366,750	8.0
Operating ratio	79.2	77.5	2.2	75.2	72.6	3.6	78.4	76.8	2.1
Net revenue: Auxiliary operations	$9,821,719	$10,145,846	*3.2*	$1,513,818	$1,634,812	*7.4*	$11,335,537	$11,780,658	*3.8*
Taxes	15,672,984	13,448,647	16.5	1,965,564	1,731,456	13.5	17,638,548	15,180,103	16.2
Operating income	42,445,249	41,110,476	3.3	8,907,266	8,856,829	0.57	51,352,515	49,967,305	2.8
Non-operating income	3,969,075	3,389,232	17.1	1,241,669	816,228	52.2	5,210,744	4,205,460	23.9
Gross income	46,414,324	44,499,708	4.3	10,148,935	9,673,057	4.9	56,563,259	54,172,765	4.4
Deductions	40,198,081	40,136,210	0.15	7,187,695	6,663,743	7.9	47,385,776	46,799,953	1.3
Net income	6,216,243	4,363,498	42.5	2,961,240	3,009,314	*1.6*	9,177,483	7,372,812	24.5
Per Cent: Gross income to fixed charges	115.5	110.9	4.1	141.2	145.2	*2.8*	119.4	115.8	3.1
Ratio: Net income to operating revenue	2.7	2.2	2.3	7.9	9.2	*14.6*	3.4	3.2	5.7
Car-miles operated	530,238,431	518,507,394	2.2	74,609,893	73,306,782	1.8	604,848,324	591,814,176	2.2

Figures in italics denote decrease. (a) Includes $7,206 undistributed expenses. (b) Includes $2,392 undistributed expenses.

TABLE III—OPERATING STATISTICS AND DERIVED RATIOS FOR THE CALENDAR YEARS 1919 AND 1920

	City				Interurban				Total City and Interurban			
	No. of Companies	1920	1919	Per Cent Increase	No. of Companies	1920	1919	Per Cent Increase	No. of Companies	1920	1919	Per Cent Increase
Operating revenue	72	$229,629,280	$196,999,475	16.6	55	$37,724,460	$32,752,494	15.2	127	$267,353,740	$229,751,971	16.4
Per mile of line	53	44,336	38,662	14.7	44	11,656	10,354	12.5	97	32,067	27,927	14.8
Passenger revenue	72	$219,950,509	$191,975,086	14.5	55	$31,729,735	$27,649,905	14.8	127	$251,680,244	$219,624,991	14.5
Per revenue passenger	68	0.069	0.063	7.9	43	0.12	0.11	9.1	111	0.072	0.066	9.1
Per car-mile	72	41.5	37.0	12.1	55	42.4	37.7	17.4	127	41.6	37.1	12.1
Per mile of revenue track	60	$25,508	$22,755	12.1	45	$8,010	$7,177	11.2	105	$20,325	$18,243	11.4
Per car-hour	68	3.72	3.81	*2.3*	46	4.64	4.09	13.4	114	3.82	3.42	11.6
Per maximum revenue car operated daily	59	$15,598	$13,729	13.6	39	$17,049	$15,410	10.5	98	$15,739	$13,894	13.2
Total passengers	71	3,903,547,828	3,755,907,509	3.9	48	274,064,071	255,575,776	7.2	119	4,177,611,899	4,011,483,285	4.1
Revenue passengers	68	2,933,559,233	2,807,339,035	4.5	42	241,660,531	226,021,569	6.9	110	3,175,219,764	3,033,360,604	4.6
Per car-mile	68	6.2	6.1	1.8	42	3.7	3.6	2.7	110	5.9	5.8	1.7
Per car-hour	66	57.4	56.4	1.7	39	46.8	45.2	3.5	105	56.4	55.3	1.9
Per mile of revenue track	58	375,540	356,788	5.3	37	74,642	69,638	5.7	95	300,169	284,316	5.6
Per maximum revenue cars operated daily	57	211,121	242,451	*12.9*	31	124,276	115,971	7.2	88	204,826	228,903	*10.5*
Transfer passengers	61	735,758,394	707,087,306	4.1	21	23,492,729	21,974,451	6.9	82	759,251,123	729,061,757	4.1
Ratio: Transfer passengers to revenue passengers	61	25.3	27.6	*8.3*	18	11.6	11.7	*.8*	79	24.4	26.3	*7.2*
Car-miles operated	72	530,238,431	518,507,394	2.3	55	74,609,893	73,306,782	1.8	127	604,848,324	591,814,176	2.2
Per car-hour	68	9.1	9.1	..	46	11.0	10.9	.9	114	9.3	9.3	....
Per mile of revenue track	60	59,723	59,147	1.0	45	18,974	18,843	.6	104	43,750	36,028	21.4
Per maximum revenue car operated	59	39,547	40,042	*1.2*	39	40,673	40,943	*.6*	98	39,656	40,130	*1.1*
Car-hours	68	45,516,538	44,425,174	2.5	46	5,495,175	5,370,832	2.3	114	51,011,713	49,796,006	2.4
Miles of line	53	4,233.4	4,137.6	2.3	44	2,545.0	2,527.8	.7	97	6,778.4	6,665.4	1.7
Miles of revenue single track	60	7,665.4	7,546.2	1.6	45	3,094.9	3,074.8	.7	105	10,760.3	10,621.0	1.3
Average maximum number of cars operated daily	59	10,591	10,258	3.2	39	1,141	1,112	2.6	98	11,732	11,370	3.1

Italics indicate decrease

The amount of service rendered by the city companies increased 2.2 per cent, while for the interurban companies it increased but 1.8 per cent. The traffic index, car-miles per revenue passenger for sixty-eight city companies, shows a slight decrease. In 1920 the ratio was 0.1615, as compared with 0.164 in 1919. For forty-two interurban companies the index was 0.2705 in 1920, as against 0.278 in 1919.

Inquiry Into Ending of Trusteeship.—Termination of the trusteeship of the Connecticut Company, New Haven, Conn., was discussed at an executive session of the committee of railroads of the General Assembly at Hartford on April 5, with the result that two of its members were delegated to ask the Attorney General for advice as to the course to be taken in turning the company over to the stockholders.

TABLE II—COMPARATIVE SUMMARIZED INCOME STATEMENT (ON A CAR MILE BASIS) OF 127 ELECTRIC RAILWAYS FOR THE CALENDAR YEARS 1919 AND 1920

	Seventy-Two City Companies			Fifty-Five Interurban Companies			127 City and Interurban Companies		
	1920	1919	Per Cent Increase	1920	1919	Per Cent Increase	1920	1919	Per Cent Increase
	Cents per Each Mile			Cents per Each Mile			Cents per Each Mile		
Railway operating revenue	43.3	38.0	13.9	50.6	44.7	13.2	44.2	38.8	13.9
Operating expenses:									
Way and structures	4.3	3.7	16.2	6.5	5.6	16.1	4.5	3.9	15.4
Equipment	4.5	3.9	15.4	4.6	4.1	12.2	4.5	4.0	12.5
Power	5.5	4.4	25.0	7.7	6.2	24.1	5.7	4.7	21.3
Conducting transportation	15.5	13.2	17.4	12.3	10.7	15.0	15.1	12.9	17.6
Traffic	0.1	0.1	....	0.3	0.3	....	0.2	0.2	....
General and Miscellaneous	4.4	4.0	10.0	6.6	5.4	22.2	4.7	4.2	11.9
Transportation for Investment Cr.	0.02	0.03	*33.3*	0.04	.001	300.0	0.02	0.02	....
Total operating expenses	34.3	29.3	17.1	38.0	32.3	17.6	34.7	29.8	16.4
Net operating revenue	9.1	8.6	5.8	12.6	12.2	3.3	9.5	9.0	5.6
Operating ratio: (per cent)	79.2	77.5	2.2	75.2	72.6	3.6	78.4	76.8	2.1
Net revenue: auxiliary operations	1.9	1.9	*5.0*	2.0	2.2	9.1	1.9	2.0	5.0
Taxes	3.0	2.6	15.4	2.6	2.2	9.1	1.9	2.0	5.0
Operating income	8.0	7.9	1.3	12.0	12.0	....	8.5	8.4	1.2
Non-operating income	0.7	0.7	....	1.6	1.1	45.5	0.9	0.7	28.6
Gross income	8.7	8.6	1.2	13.6	13.01	3.8	9.4	9.1	3.3
Deductions from gross income	7.6	7.7	*1.3*	9.6	9.1	5.5	7.8	7.9	1.3
Net income	1.1	0.9	22.2	4.0	4.0	....	1.6	1.2	33.3
Per cent: Gross income to fixed charges	115.5	110.9	4.1	141.2	145.2	2.8	119.4	115.8	3.1
Ratio: Net income to operating revenue	2.7	2.2	2.3	7.9	9.2	14.6	3.6	3.1	16.1

Public Service Railway Valuation Announced

$125,000,000 Fixed for Rate Making Purposes as Value of Property and Business Employed for Public Convenience

The value of the property and business of the Public Service Railway, Newark, N. J., as of Jan. 1, 1921, employed for the public convenience is $125,000,000 with an operating efficiency of the physical property and organization of 86 per cent. This is the judgment of Ford, Bacon & Davis, engineers, New York, who were employed by the street railway valuation commission of New Jersey, Aug. 30, 1920. "Value of Service" is the test applied.

THE engineers were instructed to ascertain and determine the value of all the property, including every proper and lawful element thereof, of the Public Service Railway, in accordance with Chapter 351, Laws of 1920, State of New Jersey. The members of the valuation commission are Edward E. Edwards, governor, William T. Read, State Treasurer, and Newton A. K. Bugbee, Comptroller.

On April 11, 1921, Ford, Bacon & Davis transmitted their complete and detailed report covering the valuation for use in fixing rates under existing laws, an abstract of which follows: In arriving at the final figure representing the value of the railway property they have been guided by the decision of the Supreme Court of the United States in Smyth vs. Ames "what the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience"; in other words, the valuation submitted includes only so much of the business and property of the Public Service Railway as it employs for the public convenience and excludes any so-called element of franchise value. The valuation also excludes the property of the Public Service Railroad.

The unamortised cost of the superseded property, which has been discarded due to obsolescense or inadequacy was found to be $4,701,943 and the reproduction cost of the property not used in operation based on Sept. 1, 1920 prices for labor and material was $645,593. Both of these figures are given in order to comply with the law, which calls for a determination of the value of all of the property.

The cost of the property as a going concern built up from actual expenditures of the company as revealed by its records, in other words the historical cost, was $119,150,163.

The report says that it seems to have been the practice in the past to attempt to determine the value of a public utility without regard to the value of the service rendered to the public, placing "as it were, the cart before the horse, and resulting in there being no real foundation for the values thus attempted to be established." If the value of the service rendered is once established, the value of the property devoted to the public use is readily determined by ordinary economic considerations. The value of service consists of the normal cost of rendering such service plus the profit necessary to induce capital to flow into the business.

The cost of service as defined includes operating expenses, plus depreciation, allowance for obsolescence where changes in the art are taking place or where the industry is growing at a rapid rate, taxes and interest on an amount sufficient to produce a modern plant and facilities for furnishing the equivalent service in an efficient and economical manner; such amount not being limited to simply the cost of the physical structure but including all costs incident to organization before and after the physical structure is functioning, and in addition thereto, generally, losses incurred during early operation which are more or less inherent in every form of business activity and are characteristic of public utilities. To this cost should be added a profit in sufficient amount to induce capital to flow into the industry.

In the findings of fact as to value no investigation was made of whether the property had in any measure been built up from past earnings or from money furnished from other sources, such as the sale of securities. This follows the ruling of the Board of Public Utility Commissioners in the Passaic Gas Case, approved by the Court of Errors and Appeals of New Jersey, which states that "deferred regulation is no excuse for refusing at present to allow a fair return upon what is the lawful property of the company."

Value is defined as the desirability or worth of a thing as compared with the desirability of something else; often confused with the qualities and circumstances on which, taken together, such desirability depends. The economic concept of value is definite and can have but one meaning, whether it is value for condemnation purposes, value in a confiscation case, value for rate making purposes or value for barter and exchange. This conception of value was recognized by the Supreme Court of the United States in 1894 in a decision rendered by Justice Brewer in Regan vs. Farmers Loan & Trust Company.

The value of an ordinary freely competitive commercial or industrial enterprise is dependent upon the value of its product or service. The engineers make a distinction between a freely competitive industry and a monopolistic organization, in which latter class public utilities were said to belong.

These more or less monopolistic enterprises, such as public utilities, instead of being regulated by the economic law of supply and demand, are kept in check by artificial restraints of the law. If the regulation proceeds to a point where the return permitted the property devoted to public use is less than that available for money invested in a competitive and unregulated industry (safety of investment being equal), value is impaired and property is taken without just compensation and the public service is itself injured as the extension of facilities is curtailed.

There is not much probability, at least in the near future, that prices for labor and material will revert to anywhere near the pre-war basis and consequently due consideration was given to existing prices in computing the value of the property. Taking cognizance of the present prices was in line with recent New Jersey decisions.

In conclusion the report stated that while an estimate of the amount of superseded property and non-operative property had been made, such allowance was not included in the final figure. Superseded property should be given consideration in the fixing of future rates if investigation proves that past rates fixed by regulation had been inadequate to give a fair return over reasonable allowances for obsolescence caused by the growth of business or changes in the art.

The property of the Railway Company was found to be on the whole well maintained except in a few instances where the physical property was not in the best operating condition, but where the condition can be remedied by the expenditure of a comparatively small sum. It was the opinion of the engineers that it would be impossible to produce a theoretical modern plant at very much less than the cost of reproducing the existing plant of the Railway Company. An analysis of the operating statements submitted by the company and a comparison with those of other street railways indicated an efficient operating organization. The report drew attention to certain economies which might be effected in several departments of the company, which would somewhat reduce operating expenses. These economies, it was added, were all given due weight in the engineers' conclusions as to the operating efficiency.

	Labor and Material	
Elements as of Jan. 1, 1921	Average Pre-war Prices	Sept 1, 1920 Prices
Reproduction cost new of the property as a going concern	$88,815,887	$189,489,560
Accrued depreciation of the physical property	14,922,144	33,646,737
Minimum value of power lease	11,194,000	19,149,000
Reproduction cost of property not used in operation	....	645,593

New Jersey Valuation Act Amended

The valuation act of New Jersey under which the preceding report was made provided that the valuation so found should be accepted as final for rate-making purpose, no means for review being included in the act. Mainly because of the lack of any review provision Governor Edwards vetoed the measure. It was promptly repassed over his dissent. Agitation was kept up for the inclusion of some means of review in the measure and at the present session of the Legislature the act of 1920 was amended so as to provide "that such valuation shall be subject to review on certiorari." Provision is further included now for cross-examination by representatives of the municipalities and others before the Board of Public Utility Commissioners of the authors of any such valuation. Hearings on applications for rate increases for electric railways are also to be given preference in their consideration over matters of routine pending before the commission. The amendments have been approved by the Governor.

Governor Urges Valuation Based on Earning Power

Governor Miller of New York has discovered that the transit relief legislation passed at his behest does not guard the public interest sufficiently in the provision which it makes for transit valuations. In consequence he rushed to the Legislature on April 13 a special message on this matter urging haste in the enactment of the amendment to the so-called Knight-Adler law now suggested as the law-making body is to adjourn within a few days.

The emergency message was one of more than 1,000 words. The Governor said in part:

> The ordinary standards of physical valuation, either original or reproduction cost, less depreciation, do not meet the emergency with which we have to deal, and physical valuations, according to any standard that could be prescribed, will in most cases under existing conditions be grossly unfair to the public.
>
> It is very difficult to prescribe by statute a standard of principle of valuation that will be fair and not too inflexible. I fear in the absence of any other prescribed standard the statute as it now stands will be construed as contemplating a valuation based on physical values which, as I have said, may prove to be grossly unfair to the public.
>
> Applied to the matter in hand the valuation should be based on the estimated prospective earnings at the fare in each case which the company is permitted to charge under its franchise or contract with the city, the valuation in no case to exceed the original cost or the fair reproduction cost less depreciation of the utility property which is necessarily employed in the public service.
>
> Of course, I construe fair reproduction cost to mean such cost under normal, not abnormal, conditions.

The Senate on Wednesday passed, unanimously, a bill which provides, in part, that:

> Such valuation shall be made with due regard to the estimated prospective earning capacity of the property necessarily used in the public service at the rate or rates of fare that the company prior to the taking effect of this act was entitled to charge.

Traffic and Transportation

Winnipeg Fare Upheld

Appeal Court Unanimous in Its Finding Upholding Rights of Public Utilities Commissioner

The right of the Winnipeg (Man.) Electric Railway to charge higher fares as ordered by the Public Utilities Commissioner was sustained by the Appeal Court of Manitoba on April 4. The decision of the Appeal Court was unanimously in favor of the company on all points. Because of its sweeping and definite nature the ruling practically ends litigation arising out of the higher fares which has been pending for more than two years. The judgment is also of far-reaching effect because in several of the provinces in the Dominion of Canada there are public utility commissions.

Immediately after the judgment had been rendered the Winnipeg City Council discussed the situation and passed a resolution favoring a plan to enter into immediate negotiations with the Winnipeg Electric Railway, while at the same time authorizing the city solicitor to carry the appeal against the judgment of the Appeal Court to the Privy Council.

It is interesting to note that for some months past A. W. McLimont, vice-president of the Winnipeg Electric Railway, has been endeavoring to negotiate with the City Council with a view to settling the transportation problem in Winnipeg permanently. Alternative suggestions proposed by the company to the City Council will now form the basis of negotiations. They follow:

1. The city taking the street railway at the present time.
2. Agreeing upon the terms under which the company shall operate for the remaining period of the franchise.
3. Making an entirely new agreement, based upon service-at-cost or some similar arrangement, in which the profits of the company shall be limited and the fares to go up or down as the cost of operation increases or decreases. The control of this form of operation might be by a commission composed of representatives of the city and the company with an independent chairman.

Briefly reviewing the situation in Winnipeg it might be stated that in the fall of 1918 the company was faced with a serious financial situation on account of increased operating costs and then applied to the City Council for leave to increase fares over those stipulated in the franchise under which the company was operating.

The City Council referred the company to the Public Utilities Commission, and two interim orders were issued by the commission which also made exhaustive valuation of the company's property. This investigation extended over two years and included a complete valuation of the company's physical assets, while the company's financial history also came under review. At the end of the investigation the commissioner made a final order raising the fares as follows:

Cash fares 7 cents.
Four tickets for 25 cents.
School children seven for 25 cents.

The city appealed against this order to the Court of Appeal.

By the terms of the order allowing the appeal to be taken the point submitted to the Court of Appeal was limited to the following question, viz.: Had the Public Utilities Commissioner the necessary authority to make the order raising the fares in so far as it affects the city of Winnipeg? Provided, that on the said appeal no question should be raised or argued as to the constitutional validity of the public utilities act, or as to the validity of the appointment of the said commissioner to his office.

The controversy between the city and the company as to the public utilities act involved two questions:

1. As to whether it was within the powers of the province to enact such legislation.
2. Whether upon the construction of the act as passed, assuming it to be within the powers of the province to pass it, the commissioner had power to change the fares fixd under the franchise agreement between the city and the company. The question before the Court of Appeal in the present instance was limited to the second of these two questions, the question as to the constitutionality of the act being eliminated.

The Court of Appeal has now unanimously decided the second question by upholding the powers of the Public Utilities Commissioner to change the fares fixed by the franchise agreement.

Boston Elevated Permitted to Run Buses

The Massachusetts Department of Public Utilities has granted its approval to the petition of the Boston (Mass.) Elevated Railway for the right to own and operate auto buses for the transportation of passengers and freight. Under the Massachusetts laws, any company desiring to operate motor buses for passenger transportation must first obtain the general approval of the Department of Public Utilities and is then obliged to secure a license from the city or town in which it proposes to operate.

The Boston Elevated desires to substitute the buses for street cars on Market Street, Brighton, a part of the city of Boston, and it will therefore proceed to petition the Boston City Council for the necessary license. The company, faced with the necessity of reconstructing its track for about 1½ miles on Market Street, where the traffic is comparatively light, decided to seek permission to abandon the track and operate the buses.

Fare Extension Accepted

Company at Columbus Hopes to Be Able to Meet $3,000,000 Improvement Program

The Columbus Railway, Power & Light Company, Columbus, Ohio, has accepted the ordinance recently passed by the City Council which assures it of a continuance of the present rate of fare, authorized more than a year ago, of 6 cents cash, or five tickets for a quarter. This action was taken by the board of directors of the company on April 7 following a period of several weeks' consideration of the Council's ordinance authorizing extension of the present tariff.

Under this ordinance the company may charge the present rate of fare during the remainder of the life of the blanket franchise under which it is now operating. This terminates April 3, 1926. Under the temporary increase granted more than a year ago the company was authorized to increase the then existing fare of 3½ cents, with eight tickets for a quarter, to 6 cents, with five tickets for a quarter, for a period ending April 3, 1922. The new legislation accepted by the company, therefore, extends the higher rate four years.

The extension was granted on the company's showing that to return to the old rate would not only compel operation at a loss, but would preclude all possibility of restoring the financial credit of the company and prevent the carrying out of improvements and extensions demanded of it under the existing franchise.

Demands of the Council for improvements during the remainder of the franchise period, in exchange for the continued high rate contemplate a program of betterments and extensions involving a cost of $3,000,000. The directors are still somewhat dubious as to their ability to make good on this consideration, but it was decided to accept the ordinance and make the best of the situation, with the hope that conditions will get better and allow the company to make a sufficient profit to permit it to meet the demands and at the same time assure itself of an adequate credit.

Company officials have assured the men that there will be no reduction in present wages, fixed by a board of arbitration about a year ago.

Seven-Cent Injunction Upheld

Judge Evans of the United States District Court, Louisville, Ky., has refused to hear that city in the matter of dissolving the temporary restraining order preventing interference with the Louisville Railway's 7-cent fare, stating that he would entertain no motions until the United States Court of Appeals decides the case.

The city will not seek to enforce penalties for collection of 7-cent fares as provided for in the Statutes of 1869 and will not take any action against the Louisville Railway other than to file a suit in the state court to enforce the contract of the company with the city.

This announcement was the one City Attorney Lawton and his assistant, W. T. Baskett, planned to make had they been allowed by Judge Evans to make a motion to dissolve the 7-cent injunction.

The city contends that the injunction hangs on the ground that the city might enforce the penalties against the company. Claim was made that the question of contract should be tried out in a state court, it having no place in a federal court.

Fares Reduced 50 per Cent

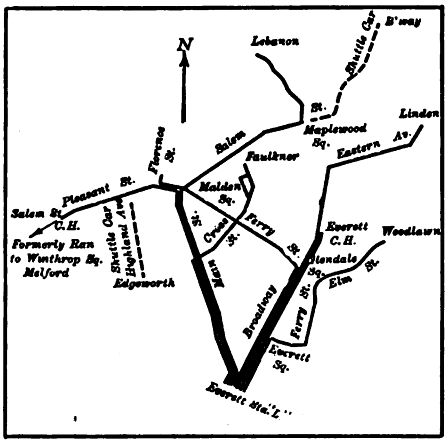
The Boston (Mass.) Elevated Railway on March 26 established a 5-cent local fare in Everett and Malden on the seven surface routes feeding the terminal of the elevated line at Everett, shown in the accompanying map.

Some idea of the service rendered and the length of the rides possible for the 5-cent fare are given in the accompanying table.

SERVICE ON BOSTON ELEVATED RAILWAY FROM EVERETT STATION

Surface Route	Length of Route (One-Way Distance) Miles	Week-Day Schedule Cars Nor.	Cars Rush	Headway Nor.	Headway Rush	Sunday Schedule Cars	Sunday Schedule Headway
Lebanon St.	4.099	5	11	10	5	5	10
Salem St., C. H.	3.405	5	15	10	3	5	10
Florence St.	3.348	5	5	10	10	5	10
Faulkner	2.665	3	7	15	6	3	15
Everett, C. H.	1.948	2	11	20	3	..	..
Linden	3.535	2	6	20	7½	5	10
Woodlawn	2.519	3	7	12	6	3	15

The Highland Avenue and Salem Street routes are changed to stub and shuttle routes instead of running to the terminal as heretofore. On these routes Brill single-truck safety cars are operated on a thirty-minute headway during normal hours, and on a 20-25 minute headway during rush hours.



EVERETT AND MALDEN 5-CENT FARE DISTRICT

Freight Delays Penalized.—The Public Service Commission of Indiana has authorized all interurban companies operating in Indiana to increase freight storage rates 1 cent a pound for every twenty-four hours. The increase was made as a penalty to cause shippers to move goods promptly.

Five-Cent Fare Denied in San Antonio

United States Supreme Court Holds that a Confiscatory Rate There Will Not Stand as City Did Not Have Franchise Power

In the case of the city of San Antonio vs. the San Antonio Public Service Company, the Supreme Court of the United States on April 11 affirmed the action of the lower court in enjoining the city of San Antonio from enforcing a 5-cent fare against the San Antonio Public Service Company. The decision is regarded as far-reaching in its consequence in Texas at least.

THE lower court contended and the Supreme Court concurs that the right to enforce such a rate was not secured by the city by contract and such enforcement was beyond the power of the city because it would mean the confiscation of the property of the railway which would result in violation of the fourteenth amendment of the Constitution of the United States.

In March, 1899, the City of San Antonio by ordinance extended to July 1, 1940, the franchise of the San Antonio Gas Company, the Mutual Electric Light Company, the San Antonio Street Railway and the San Antonio Edison Company. The ordinance provided, among other things, that the two last-named companies which operated railways in the city were to charge a 5-cent fare for one continuous ride over any one of their lines with one transfer to or from either line to the other.

In April, 1900, all the property of the two railway companies was sold under a decree of a state court to the San Antonio Traction Company, and that company with the approval of the city thereafter controlled and carried on both lines.

In 1903 the state enacted a half-fare law making it the duty of the traction company to carry school children and students for half fare and subsequently an ordinance was passed by the city in furtherance of this law. The company refused to carry out this legislation on the ground that it impaired the obligation of its contract as to the rate of fare resulting from the city ordinance of San Antonio of 1899 in violation of the state and Federal constitutions.

A suit by mandamus to compel it to do so was begun by an individual, and from a ruling adverse to the company's contention, the case was taken to the Court of Civil Appeals. That court held that it was unnecessary to consider whether the rate requirement was a contract because it was adopted long after the provision of the state constitution that "no irrevocable or uncontrollable grant of special privileges or immunities shall be made."

The final decree just rendered enjoins the city from interfering with the complainant in substituting a 7-cent fare and besides enjoins the city from enforcing the various ordinances complained of in the bill prohibiting and punishing the charging of a higher rate than 5 cents. The decree, however, reserves the right to the city to ask relief whenever, because of a change in conditions, the 5-cent fare should cease to be confiscatory. In addition the enforcement of the city ordinance imposing the half-fare rate for school children was enjoined, although the continued enforcement of the state half-fare law, which had been upheld, was expressly declared by the Supreme Court not to be restrained.

Continuing the opinion says:

> That in view of the admitted fact of confiscation the court had power to deal with the subject is too clear for anything but the statement. And we think it is equally clear that the right to regulate gives no power whatever to violate the constitution by enforcing a confiscatory rate, a result which could only be sustained as a consequence of a duty to pay such rate arising from the obligations of a contract, it follows that the solitary question to be considered is whether a contract existed empowering the city to enforce the confiscatory rate.
>
> Primarily the answer to that question must depend upon whether the ordinance of 1899 fixing the 5-cent rate was a contract. That it was not and could not be, we are of opinion, is the necessary result of the provision * * * of the state constitution, which existed in 1899, prohibiting "any irrevocable or uncontrollable grant of special privileges," when considered in the light of the irrevocable and uncontrollable elements which must necessarily inhere in the ordinance of 1899 to give it the contract consequence relied upon. * * *
>
> The fact is that all contentions of the city as to obligation of contract as to the 1899 rates illustrate the plainly erroneous theory upon which the entire argument of the city proceeds; that is, that limitations by contract upon the power of government to regulate the rates to be charged by a public service corporation are to be implied for the purpose of sustaining the confiscation of private property.

Increase Asked in Workingmen's Fare

An increase of 80 cents a month in the fare for Rock Island arsenal workingmen has been asked by the Tri-City Railway, Davenport, Ia. The men have been buying tickets for $2.80 per month, good to and from the arsenal as many times a month as their work there requires.

Figured on the basis of twenty-six working days a month, the average number, and two rides a day, the new fare schedule petitioned for would be approximately 7 cents a ride. This increase is proportionate to the raise from 7 to 9 cents on city lines in Davenport, Rock Island and Moline.

Franchise Rate Valid

The Iowa Supreme Court Decision Affects Both the Des Moines and Ottumwa Railways

The railway question at Des Moines, Iowa, has been thrown wide open again with the dismissal last week on motion of the Ottumwa Railway & Light Company of its appeal to the Iowa Supreme Court on the fare case at Ottumwa. The Ottumwa case is expected to have a direct bearing upon the rate in Des Moines by reason of the fact that Judge Martin J. Wade, of the Federal court, in granting the receivers for the Des Moines City Railway the 8-cent fare ruled as follows:

> If the Supreme Court of this State changes its former decision and holds a franchise rate valid this fare will be changed. The court will bow to the highest court of this State as it did in the 6-cent fare decision.

By its dismissal of the appeal the Iowa Supreme Court wiped out its previous decisions, and the legal battle is restored to the District Court, which previously upheld the city of Ottumwa in its contention that a 5-cent fare should be charged.

ALLOWED TO INCREASE RATES AS A WAR MEASURE

The Ottumwa case has dragged along in the courts for several years. The Ottumwa franchise provided for a 5-cent fare, but as a war measure the City Council allowed the company to charge 6 cents. With the coming of peace the city sought to restore the 5-cent fare, which was objected to by the Ottumwa Railway & Light Company on the ground of increased costs. When the case was appealed to the Supreme Court that tribunal sustained the ruling of the lower court, but on a rehearing the higher court reversed itself. The city then asked a new hearing and the dismissal of its case was asked by the Ottumwa Railway & Light Company.

Attorneys for the city of Des Moines state that as soon as possible they will make formal application to Judge Wade for an order restoring the 5-cent fare in Des Moines.

The Des Moines City Railway, through A. W. Harris, of the Harris Trust Company, which controls the company, has announced that unless the bus competition is eliminated the company will soon have to suspend operation. Mr. Harris made the above statement to the Greater Des Moines committee in proposing a service-at-cost feature of a new franchise proposal. The Greater Des Moines committee agreed to sponsor the movement and efforts were made to bring about a meeting of the City Council and attorneys and officials of the company. However, Mayor Barton declined to accept the invitation of the Greater Des Moines committee unless the meetings were in the City Council chamber and were open to the public. To date not progress has been made.

The battle between the buses and the electric railway is going on merrily in the meantime and each side is using newspaper advertising in an effort to place its story before the people.

Ten-Cent Fare Plea Heard

The hearing on the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to increase its fares from 7 cents to 10 cents was begun before the Board of Public Utility Commissioners on April 5. Rankin Johnson, president, stated that interest on bonds was defaulted on April 1 and that there are no funds with which to pay interest falling due on May 1. He said that in consequence there was a possibility that ninety cars serving as security for the bonds would be seized by the trustees under the mortgagee, leaving only thirty cars with which to maintain schedules. Mr. Johnson insisted that unless assistance is forthcoming immediately the system will have to pass into the hands of a receiver.

Even with an increased rate, Mr. Johnson said, the receipts of the corporation would fall approximately $50,000 short of the sum required to meet expenses for the first year. He thought a higher fare would result in a falling off of not more than 5 per cent in the number of passengers, and that this would be but temporary.

Although the system is not confronted by jitney competition, Mr. Johnson declared that the receipts were undoubtedly affected by what he characterized as "private automobile competition." He testified that the corporation enjoys the advantage of a wage agreement slightly lower than that under which the Public Service Railway is working and also less than that prevailing in other cities similar in size to Trenton.

Transportation News Notes

Special Mid-day Fares Help Traffic.—It is announced that the cheap mid-day fares on the London County Council Tramways have so stimulated traffic as to produce substantial financial benefit.

Seeks Higher Fare.—The Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., has applied to the State Railroad Commission for permission to increase its lighting, power and street car rates.

City Proud of Its Five-Cent Fare.—Cars of the Lincoln (Ill.) Municipal Railway are to carry placards announcing a 5-cent fare, primarily for the edification of the visitor to that city as an advertisement of economical management of a municipal enterprise.

Railway and Jitney Schedules Articulated.—The Board of Aldermen of Dover, N. J., has passed an ordinance compelling jitney operators to pay a license fee of $100 a year and to arrange schedules so they interpolate those of the Morris County Traction Company.

Ferry-Railway Transfers Urged.—David W. Henderson, superintendent of the Seattle (Wash.) Municipal Railway, has refused to commit himself as to what the attitude of his office would be regarding the matter of entering into an agreement with the operators of the Elliott Bay ferry to West Seattle for the exchange of transfers from the cars to the ferry and from the ferry to the cars. A petition signed by several hundred citizens of West Seattle urges that the city take action to secure a transfer arrangement in order that the ferry, which is now losing money, may continue to operate.

Denver Tramways Seeks Fare Increase.—Application for a 20 per cent increase in interurban fares has been made by Ernest Stenger, receiver of the Denver (Col.) Tramway, to the Colorado Public Utilities Commission. The increased fares would affect traffic on the Denver-Golden and Denver-Lyden lines. In his petition to the commission Receiver Stenger points out that the increase would make the tramway fare to Golden the same as is now charged on the Denver & Intermountain line. Since Aug. 6, 1918, when the commission granted the city tramway a 7-cent fare, it has been charging 7 cents on its interurban lines.

P. R. T. Asks Continuation of Present Fare. — The Philadelphia (Pa.) Rapid Transit Company has filed at Harrisburg an application with the Public Service Commission for a continuance of the four-ticket-for-a-quarter tariff now in effect. If the request is granted, the present rates of fare would be continued after May 1, fixed as the time limit for the present tariff granted by the commission on Nov. 1. Valuation proceedings now under way will, it is expected, be completed within three months. The value fixed will determine the amount of returns to which the company is entitled and in that manner, will also fix the permanent rate of fare to be charged by the company.

Injunction Against Jitney Ordinance Denied.—Judge Hall at Kansas City, Mo., has refused to grant a permanent injunction restraining the enforcement of the ordinance prohibiting jitneys from operating on streets where electric railway cars are run. Jitneys began operating on April 7 over new routes away from rail lines. These routes took the jitneys through Eleventh Street, known as Petticoat Lane, the chief east and west shopping street. Merchants protested against congestion on this thoroughfare and Mayor Cowgill immediately ordered the jitney inspector to change this routing, and by noon jitneys were eliminated from that street. The Kansas City Railway had extra cars in service and speeded up schedules in response to the new conditions.

Personal Mention

Joins Consulting Firm

Mr. Litchfield, Formerly Engineer of the American Car & Foundry Company, Joins Gibbs & Hill

Norman Litchfield, who for the last three years has been mechanical engineer of the American Car & Foundry Company, New York, has resigned to join the staff of Gibbs & Hill, consulting engineers. He will devote special attention to electric locomotive and car equipment work. This will not be Mr. Litchfield's first experience in consulting work, for at one time he worked under L. B. Stillwell in the preparation of plans for the equipment of the New York subways.

During the period that experimental work was being carried on by Mr. Stillwell with the cars that had been designed for the subway Mr. Litchfield had charge of the tests. When the operation of the subway began he joined the engineering staff of the Interborough Rapid Transit Company, with which he was connected for a good many years. Previous to his association with Mr. Stillwell he served his apprenticeship in electric railroading in the shops of the Brooklyn Rapid Transit Company. He was graduated from Stevens Institute of Technology in 1901 with the degree of mechanical engineer.

NORMAN LITCHFIELD

Mr. Litchfield has been a very valuable contributor to the JOURNAL. He has written a great many articles on technical subjects dealing particularly with the fundamentals and details of car bodies and truck construction. In 1920 the JOURNAL began the publication of a series of articles by Mr. Litchfield on railway car materials. These were written with the idea that the ordinary mechanical man of a railway is confused when seeking specific information by the vast amount of material confronting him. It was also felt that a better understanding of the characteristics of various materials used in car construction would result in simpler and more uniform specifications being drawn up for car builders, and in this way cause a step toward standardization to be taken to effect greater economies in materials and cost.

Mr. Litchfield has been actively interested in the work of the American Electric Railway Engineering Association and served as its secretary for a number of years. He is also a member of the executive and standards committees of the association.

Los Angeles Railway Has an Official Question Target

George E. Ferguson has been made special representative of R. B. Hill, superintendent of operation of the Los Angeles (Cal.) Railway. This is a new position which has been created so that there might be some one to help the trainmen in their work.

Mr. Ferguson will go from one division to another unannounced and at different times of the day to talk over with the trainmen in an informal way any of the points about which they may wish to question him. In this capacity he will also meet the men around the assembly room and discuss service with them on their own ground instead of over a desk top. This method, it is hoped, will give a personal touch under which everyone will feel free to discuss matters for the betterment of service.

Mr. Ferguson has been with the Los Angeles Railway since 1905, and has served in practically every section of the operating department. This experience makes him well able to give correct information on questions pertaining to any phase of a trainman's work. At the time of his appointment Mr. Ferguson was in the schedule department.

Mr. Trazzare, Publicity Manager of Georgia Railways, Resigns

J. F. Trazzare, manager of publicity department of the Georgia Railway & Light Company, Atlanta, Ga., severed his connection with the company on April 1. This was occasioned by the reorganization of some of the work of the company along the lines of publicity, safety and employment, all of which had been under Mr. Trazzare's direction. In the interests of economy the company has discontinued these as separate departments. The safety work of the company has been placed under the direction of F. L. Butler, the new general manager of railways.

Up to the present time no definite publicity organization has been effected. Meanwhile the publicity work of the company will be handled by Mr. Atkinson, chairman of the board of directors, and Mr. Arkwright, president of the company.

W. R. Dunham, Jr., Resigns

Former Connecticut Company Engineer Joins Construction Firm of Engel & Hevenor

William R. Dunham, Jr., resigned as engineer of maintenance-of-way of the Connecticut Company, New Haven, Conn., on April 15 to become chief engineer for the firm of Engel & Hevenor, contracting engineers, New York City, and for H. P. Hevenor, a member of the firm, in his private engineering practice.

Mr. Dunham is rounding out thirty years of engineering work in the electric railway field, which he entered as a student in an engineering office in Providence, R. I., where work was done for the Union Railroad, a horse railway of that city. When the railway organized its own engineering department Mr. Dunham joined it, and as the system developed he was rapidly promoted. When, in 1893, the Union Railroad was merged in the United Traction & Electric Company he became principal assistant in track matters.

W. R. DUNHAM, JR.

In 1902, when the United Gas Improvement Company took over the Providence property and formed the Rhode Island Company, Mr. Dunham's duties were radically changed for a time. Due to his familiarity with the layout of the property he was assigned to develop a system of transfers, for which purpose a new department was formed. However, two years later he went back with the engineering department in charge of all civil engineering matters.

In 1906 Mr. Dunham went to New Haven to become assistant engineer in the maintenance-of-way department of the Consolidated Railway (now the Connecticut Company), becoming engineer of maintenance-of-way in July, 1914, which position he has held ever since. In this position he did most valuable construction, maintenance and valuation work. Recently he was an appraiser of the property of the Shore Line Electric Railway, Norwich, Conn., and also assisted the Public Utilities Commission of Connecticut in valuation work.

During his engineering career Mr. Dunham has taken an active part in the affairs of engineering and other associations. He has been a member of the American Electric Railway Association since 1915, and was president of the Connecticut Company local section of that association. He has been a member of the A. S. C. E. since 1906, and was chairman of the committee which formed a local section of that body. He is a past-president of the Connecticut Society of Civil Engineers. He is also an active member of the American Association of Engineers, of the New Haven Railroad Club, and of the New England Street Railway Club. In leaving the operating railway field Mr. Dunham will have occasion to keep up his affiliation with most of these organizations, for the firm of Engel & Hevenor does much electric railway construction work.

No successor to Mr. Dunham will be named for it is intended to leave his former position vacant indefinitely. The three division engineers who formerly were required to report to him as engineer of maintenance-of-way will now be responsible to General Manager J. K. Punderford.

R. S. Moore has resigned as vice-president in charge of the New England investment business of the Byllesby Engineering & Management Corporation.

J. W. Ellingson, traffic manager of the Utah-Idaho Central Railroad, Ogden, Utah, resigned March 1, to become traffic manager of the Amalgamated Sugar Company.

J. M. Martin has been appointed auditor for the Piedmont & Northern Railway, Charlotte, N. C., to succeed Bond Anderson, who resigned April 1 to engage in private business. Mr. Martin has been head bookkeeper in the office of the Piedmont & Northern for the past several years, and will have charge of the general auditing of the company.

Edward M. Moore has been appointed by Director Twining as private secretary to the director of the City Transit Department of Philadelphia, Pa. The former private secretary to the director was John Egan. He resigned many months ago and no appointment was made to the vacancy until the choice of Mr. Moore, who is a son of Mayor Moore of Philadelphia.

C. W. Loughry will succeed Frank P. Litschert as secretary of the Public Service Commission of Indiana on May 1. The new secretary is a graduate of Indiana University and the Indiana University Law School. Mr. Litschert, who will retire as secretary of the commission, was private secretary of ex-Governor Goodrich and his appointment to the service body place was a temporary one following the resignation of Carl Mote at the end of the Goodrich administration.

Hilding Angstrom, chief engineer of traction lines of Malmoe, Sweden, a city of 150,000, was in Terre Haute, Ind., recently inspecting the Terre Haute traction plant and system, and giving special attention to the little green cars. He said to E. M. Walker, general manager: "I came to Terre Haute for the reason that I was told that progressive traction methods are being worked out here. Your shops and plants show efficiency, even by a casual visit. I believe the small cars are the traction solution for short hauls and for lines which do not encounter trying topographic and other hard conditions."

A. P. Patterson, appointed acting general superintendent of the railway department of the New Orleans Railways & Light Company, New Orleans, La., to fill the vacancy caused by the resignation of N. H. Brown, entered utility work in 1905 as general manager of the street railway, electric and gas properties in Meridian, Miss. He remained there until December, 1917. From 1910, when Henry L. Doherty & Company purchased these properties, until he left the Doherty interests, he was called upon to make examinations and valuations of a number of other properties. During 1918 and 1919 Mr. Patterson was engaged in a private engineering business which, on Jan. 1, 1920, he sold to accept a position with J. K. Newman, New Orleans, La., chairman of the bondholders' committee of the American City Company, New York. Through that connection he was assigned certain duties with the New Orleans Railway & Light Company and upon the resignation of N. H. Brown, was appointed acting general superintendent of the railway department.

Obituary

Warren G. Bristol, Manager

Warren G. Bristol, manager of the Hartford lines of the Connecticut Company, is dead. His body was found in Keney Park, Hartford, Conn., with his temple pierced by a revolver bullet. His death came as a great shock to the community and to his many friends, for Mr. Bristol was highly appreciated both as a man and for his ability as a railway manager. His associates had the highest regard for him. He was extremely popular among the employees and knew hundreds of trolley crews personally.

Not long ago, before a public gathering, he expressed great faith in the future of the electric railway. At that time he said:

> I have devoted my life to the trolley business, and it might appear to some as if in the later years of my life I might be discouraged at the outlook, but I look for a re-establishment of the trolley companies in the public favor, and do not believe the time has come or will come in the near future when jitneys and motor buses will take the place of the trolley systems. There is such an urgent need for trolleys to obtain the development of outlying district that I think within a few years there will be a great expansion of the trolley lines.

Mr. Bristol's first affiliation with street railways dates from October, 1893, when he was engineer of the construction crew which was engaged in building the trolley line between Meriden, Conn., and Wallingford. At that time he was under Norman McD. Crawford, who is now vice-president and treasurer of the Columbus Railway, Power & Light Company, Columbus, Ohio. When the line was completed he remained at Meriden as assistant to the superintendent and a year later, when the road was purchased by the New York, New Haven & Hartford Railroad Company, he himself became superintendent.

For about ten years Mr. Bristol was superintendent of the lines in the vicinity of Meriden. His career there was marked with success and when the opportunity offered itself in February, 1906, his superiors transferred him to Hartford as manager of the local lines covering a territory of 164 miles. It was this position that he held at the time of his death to the mutual satisfaction of city and company officials and the traveling public.

Some years ago he showed himself possessed of inventive genius and, in the interests of his company, developed and perfected the four-section stone and dump car, which is known as the Bristol multiple-body dump car. This type of car is used extensively on the Connecticut Company's system for the quick transportation and disposition of crushed stone, gravel and earth. Because of the compartments and mechanical devices for dumping, it makes possible the discharging of loads along the trolley routes where construction or repair work is in progress without delaying passenger traffic.

Mr. Bristol was born in Cheshire, Conn., on April 21, 1873. He received his early education in that town and was afterward graduated from the Yale Business College in New Haven, Conn. He was popular in railway circles, having served as vice-president of the New England Street Railway Club for one year and, in November, 1917, was elected president of the Connecticut Company Section No. 7, A. E. R. A.

Ferdinand O. Reed, chief ticket clerk of the Portland Railway, Light & Power Company, Portland, Ore., for the last eight years, died suddenly in that city on Feb. 18.

J. J. Swan, who had held the position as chief of the appointment bureau in the transportation department of the New York (N. Y.) Railways, died recently while on his way to his office. Mr. Swan was well known in and about New York City because of his long service with that company, which extended over a period of thirty-nine years.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Brake Shoe Prices About $12 Less per Ton Since Jan. 1

Market Is Quiet with Producers Making Prompt Deliveries and Curtailing Present Good Stocks

The market for brake shoes presents much the same features as other railway equipment lines at this time. Stocks of finished material are large—too much so for a declining market, and producers are therefore following a retrenchment policy on production. Deliveries are, of course, immediate.

Buying for the most part is for immediate needs only and though the outlook seems to be that the brake shoe market has passed its lowest point and hence is somewhat optimistic in tone, there does not seem much chance that sales will equal those of last year. It is quite possible that a good demand will develop this fall, however. The replacement of wornout brake shoes, which is undoubtedly the chief factor in buying, has been one of the points upon which railways, especially steam, have economized. Many of the large number of idle freight cars on steam roads have been stripped of brake shoes, it is reported, to care for the rolling stock in actual operation. In the electric railway field this condition is of course not true and there the buying is said to be proportionately greater, some traction companies carrying from a two to three months' supply.

The second reduction this year in brake shoe prices was recently announced by one of the leading interests. The cut, which was effective April 1, was in the same amount as the previous decrease of Jan. 1, or about 8½ per cent. This is equivalent to a drop of $6 per ton. The further price trend is largely dependent on malleable iron and labor costs, though it should be remembered that brake shoes have been advanced in price since before the war less than almost any other item of railway equipment.

Electrical Exports for February Hold Up Well

February's electrical exports, although they were $2,000,000 under those of January, a record month, amounted to $13,632,478. Last October the exports took a decided jump of more than two million and in November went over the ten million mark. December was over thirteen millions, January was over fifteen millions and February is holding up well.

Total exports of January and February amount to $28,965,433. It took four months of last year to approach this figure. The year 1916 was the first year to bring in total exports higher than those of the first two months of 1921, which were nearly thirty millions. Last year's total was $102,618,508, and if 1921 continues at its present rate the total will yield over $170,000,000. With all the slump in the general exporting market it appears that the electrical industry is holding up its end of the game in a very encouraging way. American electric railway products have always held an important place in supplying South American markets especially.

Corporation Reduces Prices on Many Steel Products

Effective Immediately, Prices Are from $1.50 to $15 a Ton Lower Than Former Schedule, a Decrease of from 3.8 to 17 per Cent

Effective at once a reduction in prices of many steel products ranging from $1.50 to $15 a ton was announced on Tuesday by Judge E. H. Gary, chairman of the Board, for the United States Steel Corporation. This supersedes the schedule to which the corporation has been adhering since its approval by the Industrial Board in March, 1919. Reductions on tubular goods and on sheets, it is stated, have not been completed and will probably be announced within the next few weeks. Steel rails and wire nails are unchanged.

In comparison with the former schedule the new prices effect a reduction of $9 a ton in plates, $5 a ton in structural steel, $5 in bars, $9 in wire rods, $7 for plain wire, $8 for sheet bars and small billets, $4 for slabs, $1.50 for 4 x 4 and heavier billets and $15 a ton for tin plates.

Independent mills have until last winter been holding to a schedule higher than that of the corporation, but last November a downward trend commenced in hope of stimulating business. Although this finally brought independent prices below those of the corporation it also brought little new business. It has been a common expression among the trade that a reduction in price by the leading interest would prove a stimulant not only to the steel industry but also to all industry, and particularly to building. It remains to be seen now what effect this cut of late last Tuesday will have.

No statement was made that wages in the corporation mills would be reduced in line with the prices of steel but it is believed in many quarters that this action will be taken in the near future.

Ten per Cent Reduction on Line Hardware

Manufacturer's Decrease of 7½ per Cent Passed on at Higher Figure by Jobbers

Pole-line hardware prices have again taken a drop. The reduction as announced by a leading manufacturer, effective April 11, amounts to about 7½ per cent, but this cut has been passed on by jobbers and distributers on an average of about 10 per cent. Other manufacturers are expected to follow suit in reducing quotations.

Prices quoted to electric railways and central stations by jobbers on representative material, f.o.b. Chicago, are as follows: Carriage bolts, ⅜ in. x 4½ in., $2.25 per 100, compared with $2.45 previously; cross-arm braces, 1¼ in. x ¼ in. x 28 in., $13.25 per 100 as compared with $15; machine bolts, ⅝ in. x 12 in., $9.95 per 100 as against $11.15. Lag screws, 1½ in. x 4 in., are now priced at $4.25. General price reductions of from 5 to 7½ per cent were made on line hardware the middle of last February, and previous to that decreases of 5 to 15 per cent had been made during December and early January, so this is the third decided reduction in hardware prices that producers have made.

In general consumers have not entered the market very actively this spring, although demand from power companies is said to be increasing recently. As a result of the quiet market producers are only operating at from 50 to 75 per cent of capacity. Reserve stocks are sufficient to care for all immediate needs with prompt shipments.

Crossarms Drop Ten per Cent in Price

The Third Reduction Which Has Been Made This Year Should Provide Stimulus to Buying

Following the price reduction of 9 to 15 per cent on Rainier fir and long-leaf yellow pine crossarms that was made on March 1, as announced in the March 12 number of the ELECTRIC RAILWAY JOURNAL, prices have again been reduced. The decrease, which is effective April 11, amounts to about 10 per cent and applies to the representative prices that were quoted in the March 12 issue. This is the third general price reduction inside of two months and a half, the first, on Feb. 1, amounting to 15 per cent.

It is hoped that this latest price decrease will serve as a stimulus to demand, especially as it comes at a time when kindred lines, such as poles and line hardware, are also reduced. Up to the present time the market has remained very quiet, and although stocks are good and deliveries prompt consumers have not followed up their inquiries by ordering but have preferred to hold off buying, presumably, until they think prices have reached a level low enough to represent a good buy.

Sweeping Price Reduction on Western Cedar Poles

Freight Rate Also Declines Slightly—Demand Seems on the Increase, with Good Stocks and Prompt Shipments

In order to do their share in bringing general prices to a level which will command public confidence and stimulate new activity in the industry, producers of Western red-cedar poles have announced decided price reductions. The extent of the cut, which was effective April 6, ranges in general from about 15 to 22 per cent. The new prices as compared with the old quotations on representative sizes are as follows: F.o.b. Chicago, 30-ft., 7-in. top, $8.50, $10.90; 35-ft., 8-in. top, $14.30, $16.25; 40-ft., 8-in. top, $16.80, $19.80. The same poles f.o.b. New York show the following new prices compared with the old: 30-ft., 7-in. top, $9.55, $12.20; 35-ft., 8-in. top, $16.10, $18.30; 40-ft., 8-in. top, $19.15, $22.40.

ALTHOUGH PRICES ARE REDUCED, COSTS ARE STILL HIGH

In addition to this decrease there is a further reduction of 6 cents per hundredweight based on the weight of poles at time of shipment, allowable as the result of lower freight rates which went into effect on Western red cedar poles April 1. On a 35-ft., 7-in. top pole this is said to amount to about 30 to 35 cents. The action of producers in dropping their prices, it is stated, is not entirely justified by lower costs, but in view of the tendency of consumers to hold off buying it is taken in the hope that business will be stimulated thereby. Northern white-cedar poles as yet remain unchanged in price but the Southern white-cedar product was reduced about 15 per cent more than a month ago.

Demand at present is not large but seems to be on the increase, central-station companies especially showing considerable interest in the market. Electric railways are not placing many orders but producers are quite generally optimistic that before the year is out sales will have mounted to good proportions. Stocks of poles in the West are quite large, and as a result immediate shipments can be made to Eastern points. Sales west of the Mississippi are said to be in greater volume than nearer the Atlantic coast, for in the latter territory demand has in large part been supplied by local chestnut poles, which are somewhat cheaper in first cost.

Germans Again Undersell Electric Export Market

Word comes from the ELECTRIC RAILWAY JOURNAL'S correspondent in Sweden that all German business seems to be in one great muddle with no one very much concerned. Even so and with the high export fees, Germany continues to outsell everybody, thanks to the rate of exchange. The Swiss railroads, for instance, are offered Brown-Boveri electric locomotives for 1,000,000 francs apiece, while the A. E. G. offers the same thing, f.o.b. Switzerland, for 600,000 francs.

In one thing only does this correspondent find that the Germans are high and that is insulators. One very large order for the Swedish Board of Waterfalls went to an American company at a price laid down in Sweden that was lower than the Germans could meet.

Canadian Equipment Manufacturers Undersell This Country

As an instance of the difficulties which beset American manufacturers of electric railway equipment who would sell their product outside this country, the experience of a large Canadian electric railway in buying some new cars is significant. This company required twenty new street cars and called for bids in the United States and Canada. The most inviting bid was received from a well-known car manufacturer in this country and on the face of things this concern should have received the order. But when the traction company came to figure approximately 15 per cent increase in cost on the difference in exchange rates, not to mention the customs duty and the expense of a long freight haul, it found it necessary to revise its plans. Accordingly the number of cars ordered was reduced from twenty to ten, and these were equally divided between two Canadian manufacturers. The inference here is that the Canadian bids were so high that the size of the order had to be cut in half, yet the bids as accepted still represented a lower price than car manufacturers in this country could meet under the burden of exchange rates, duty cost and freight charges. According to the same source of information Canadian electric railways, which in the past have purchased much material in the United States, have now been obliged to break away almost entirely from this custom, due principally to prevailing exchange rates. The Canadian dollar is now 88½ cents.

Rolling Stock

Indianapolis (Ind.) Street Railway Company has recently had a number of open cars rebuilt by the Barney & Smith Car Company, Dayton, Ohio. The cars, which were originally built by J. G. Brill Company and which have been in use for twenty years, were inclosed and refitted for prepayment fare operation.

Franchises

Glendale & Montrose Railway, Glendale, Cal.—The Board of Trustees of the City of Glendale has given notice of the sale of the franchise of the Glendale & Montrose Railway. The franchise calls for the operation and maintaining of a street railway along certain streets of the City of Glendale for a period terminating Nov. 4, 1963.

Track and Roadway

Tidewater Southern Railway, Modesto, Cal.—Work has been started at Modesto, Cal., grading for the new route of the Tidewater Southern Railway into this city. The new road will come along the west bank of lateral four as far as Nellie Street and there cross the canal and come along Nellie, thence over P Street to Ninth and join the present tracks at the corner of Ninth and N Streets.

Columbus Railway, Power & Light Company, Columbus, Ohio. — Much of the program calling for the expenditure of $3,000,000 facing the company is extension of present lines. One project contemplates extension of service 1¼ miles north of Columbus, a short distance beyond Clintonville. The company is now negotiating with the Columbus, Delaware & Marion Railway for the use of that company's tracks north of the city. Another extension is that to the suburb of Shepard, contemplating a mile of new track, while the company is also asked to extend its service on the Leonard Avenue line to Fifth Avenue, a distance of about a mile. These, in addition to much repaving work, delayed by the city because of the company's inability to do its share of the improvement, constitute the major part of the program.

San Francisco - Oakland Terminal Railways, Oakland, Cal. — The San Francisco-Oakland Terminal Railways has asked permission of the City Council of Oakland to double-track its line on Lake Shore Avenue between Prince Street and Walla Vista Avenue.

Montgomery Transit Company, Norristown, Pa.—The Montgomery Transit Company will reconstruct about 6 miles of track.

Charleston (W. Va.) Interurban Company.—The Charleston Interurban Company has been awarded a franchise by the City Council for the construction of a loop through Ruffner Avenue and the establishment of a one-man car line in this section. With the construction of the Ruffner Avenue loop one-man cars will also be placed on the Duffy Street loop.

Spokane & Eastern Railway & Power Company, Spokane, Wash.—The Spokane & Eastern Railway & Power Company and the Spokane Traction Company will spend $151,000 in improvements and replacements during 1921, according to the year's budget made by Vice-president F. E. Connors. Part of the money will be used for rehabilitation of eighteen of the traction cars to be made into one-man cars. Renewal of electric equipment will cost $20,000, maintenance of traction lines will cost $35,000, mechanical improvements $30,000, and the remainder will be spent for engineering improvements.

Seattle, Wash. — The utilities committee of the Council has voted to recommend the extension of a street railway line from the Duthie Loop on West Spokane Street north of Harbor Island, a distance of one mile, to the Todd Ship Building Company's plant at the north end of Harbor Island. The action was taken after petitions had been submitted by various firms on the island, and it was agreed that the cost of the railway, $19,000, will be advanced by the properties and firms benefited. It was agreed that eventually $9,500 of this cost will be refunded by the street railway department. During the peak hours of travel service will be taken care of by several service cars, with 45-minute trips during the rest of the day.

Windsor, Ont.—A direct car line to link up the southern sections of Windsor, Walkerville and Ford with main service is suggested.

Windsor, Ont.—Construction of street railway extension is contemplated by Hydro Electric Power Commission, Essex Division, Sandwich Street.

Montreal (Que.) Tramways. — Construction of the Mount Royal Tramway will be started this spring according to a definite announcement made by city authorities. This project has been under consideration for some time. Judge Saint Cyr, chairman of the Montreal Tramways Commission, has received a letter from E. R. Decary, chairman of the Administrative Commission, which gives definite instructions. The route will be along Shakespeare Road.

Power Houses, Shops and Buildings

Fort Wayne & Bluffton Traction Company, Fort Wayne, Ind.—Fire destroyed a substation and interlocker at the intersection of the Fort Wayne & Bluffton Traction Company's line and the Clover Leaf Railroad late April 6 with a loss of $10,000. The flames started from a short circuit in the substation.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway will build one small carhouse, one substation and freight house. The railway will also purchase automatic control equipment for three substations.

Wilkes-Barre & Hazelton Railway, Hazelton, Pa. — The Wilkes-Barre & Hazelton Railway has purchased from the General Electric Company two 750-kw. 60-cycle rotaries with two three-phase transformers and a complete switchboard for automatic operation. This power equipment will not be delivered until July.

Professional Notes

G. E. Engineering Company, Inc., New York City, under date of April 1 announces the removal of its offices to 449 West Forty-second Street, a change that is made in line with the company's expansion of business.

William S. Turner & Company, Portland, Ore., announces the formation of an organization under the above name to act as manufacturers' agent for electric railway, power station, pumping and industrial plant equipment; to make reports appraisals etc.; and to design and construct public utility, municipal and manufacturing works. Mr. Turner will continue his business as consulting engineer in which he has been engaged for the past ten years. He has associated with himself among others, his son, Edmond S. Turner, a graduate of Stanford University, who will specialize in commercial engineering along electrical and mechanical lines. Among others the company is at present the representative of Heine Safety Boiler Company, De Laval Steam Turbine Company, Sanford Riley Stoker Company, C. H. Wheeler Mfg. Company and the James Leffel Company.

Trade Notes

Track Specialties Company, 29 Broadway, N. Y. City, announces the appointment of the Busch Corporation, 13 North Seventh Street, St. Louis, Mo., as its agent in that territory.

The American Engineering Company, Philadelphia, maker of the Taylor stoker, has established a Mid-Western service station at 1772 West Lafayette Boulevard, Detroit. A complete stock of parts for all sizes and types of these stokers is carried and immediate shipments will be made, it is announced.

The Canton Culvert & Silo Company, Canton, Ohio, reports two recent orders of more than usual size. A ten-carload order of "Acme" (nestable) Toncan metal culverts was shipped to a railroad in Cuba and the Pennsylvania State Highway Department, at Harrisburg, Pa., has awarded its annual contract to the company. The latter order totals approximately 52,000 lineal feet of corrugated metal culverts in various diameters, the equivalent of about thirty carloads.

Trackless Transportation Corporation announces the opening of general offices at 300 Madison Ave., N. Y. City. This newly organized firm of engineers and manufacturers of "The Imperial Omnibus" designed for twenty and thirty passengers with single-deck, and 50 passengers with double-deck, is prepared to plan, install, and supervise motorbus transportation systems and to furnish specially designed buses and equipment.

Electric Power Equipment Corporation, Philadelphia, Pa., announces the opening of a district office and warehouse at 215 Tenth Street, Huntington, West Va., under the direction of L. T. Hall, who has been superintendent of construction for the company, formerly Lewis & Roth, for several years. Formerly he was with the Brooklyn Rapid Transit Company, the Norfolk & Western Railway Company and other concerns in both operating and construction work.

New Advertising Literature

Refractories.—"Clinker Proof Furnace Walls" is the title of a folder issued by the Bernitz Furnace Appliance Company, 15 State Street, Boston.

Valves.—The Rensselaer Valve Company, Troy, N. Y., is distributing book No. 12, describing its "Rensselaer" throttle and control valves.

Trademarks.—"The Work of the Trade-Mark Bureau" is the title of a booklet distributed by Mida's Trade-Mark Bureau, Ellsworth Building, Chicago.

Shop Tools.—Buffalo (N. Y.) Forge Company is distributing a catalog on its various types of forges, drills, and machines for cutting, punching and slitting metal.

High-Tension Switches.—The Royal Electric Manufacturing Company, Chicago, is issuing bulletins Nos. 20 and 25 inclusive, describing a new line of high-tension air-break switch equipment and outdoor bus supports.

Wire.—Copper Clad Steel Company, Rankin, Pa., has issued a sheet on "Copperweld Wire," comparing it with weatherproof, strand, and bare copper wire as to weight, breaking load, resistance etc.

Blowers.—The "Coppus" turbo blowers for undergrate draft and other industrial service is described in a recent publication of the Coppus Engineering & Equipment Company, Worcester, Mass.

Heater Temperature Control.—Consolidated Car-Heating Company, Albany, N. Y., has issued a new bulletin No. 13-B, illustrating and describing its system of thermostatic control for electric heaters.

Acceptances. — "Acceptances, Trade and Bankers'" is the title of a new book just published by D. Appleton & Company, New York City, written by Park Mathewson, vice-president of the Business Bourse, New York.

Overhead Expenses. — Chamber of Commerce of the United States of America, Mills Building, Washington, D. C., has just issued a pamphlet on "Overhead Expenses: How to Distribute Them in Good and Bad Times."

Combustion.—"The Burning Question" is the title of a new book issued by the Green Engineering Company, East Chicago, Ind., dealing with the question of proper combustion. "The Green Cast Iron Hopper Book," recently issued by the company, describes the cast-iron and structural-steel hopper.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
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Electric Railway Day on May 4

IT WAS a happy idea to have an "Electric Railway Day." The time is short in which to prepare for any extended celebration, but impromptu affairs are often the most successful and no elaborate program is necessary to do something. It does not take long to resurrect one of the early cars and put it in charge of an old crew for operation on May 4. From this step to advertising for some of the first passengers, getting together some facts about the kind of service furnished, length of ride and fares charged in the early days, and following some of the other suggestions made by President Gadsden, is not a difficult one. If the idea of "Electric Railway Day" works out well on the smaller scale which only is possible this year, a more elaborate plan can be arranged for next year. The advertising department of the association is co-operating to the full extent of its ability by making suggestions of what to do, and it is hoped that as many companies as possible will try out the idea.

In Union Is Strength, Especially in the Freight Business

THE handling of freight and express matter is a legitimate function of electric railways and when it is properly done it proves to be profitable. George M. Graham, vice-president Pierce-Arrow Motor Car Company, threw down the gauntlet before the electric railway industry last October when at the Atlantic City convention he said: "Except in isolated cases the suburban trolley is barred from developing any considerable volume of freight haulage." This disqualification, Mr. Graham thinks, results from the confinement of the trolley car to a fixed route. His challenge must be met, not with words but with profits. The companies which are transporting goods, as well as people, must show with the aid of accurate accounting that they are making money in this department, or that they can do so if given adequate facilities.

Interurban railways have been engaged in handling l.c.l. and carload freight traffic for many years. Their experience has not led them to consider abandoning this business. The recent motor-truck competition has stimulated their interest rather than discouraged it. The truck has one outstanding virtue, ability to pick up, transport and deliver goods in one handling. Lack of this ability is admittedly a handicap to the trolley, but this does not outweigh its many inherent and unique qualities. The possession of a well-graded steel runway, of highly efficient propulsion equipment, of durable wheel tires and motive-power equipment, of almost unlimited speed capacity, of ability to operate with small labor cost per ton-mile of freight movement, of skill in transportation management, of an effective maintenance organization, etc., is surely going to count for something.

But the electric railways must pull together to get the best results in this line. They must go after their legitimate share of the business with vim and with skill. The up-to-date spirit in this matter was voiced at the recent New York City meeting of the New York Electric Railway Association, at which encouraging facts were marshaled. One feature was a brief account of the co-operative movement in Rochester, visualized in the new freight terminal. Elsewhere in this issue is an illustrated account of the new terminal with some detail of the business which centers in it. Three strong interurbans are co-operating at Rochester. They are getting results. Their experiences will be interesting, stimulating and otherwise helpful to other roads which now handle freight or expect to do so.

The American Association Is Being Reborn

CERTAINLY railway men who read the report of the meeting of the executive committee of the American Electric Railway Association, printed on another page of this issue, will consider that the association is to be congratulated, and duly thankful, that it is under the leadership it now has. If any one had any doubts as to the correct answer to Mr. Wehle's question of a few weeks ago as to whether the industry would appreciate and follow the leadership of its president, Mr. Gadsden, such doubts must now be disappearing or dispelled.

In the unpleasant situation which recently arose at the headquarters of the association, it would have been easy to let events control, merely to pull through and continue on the old plan as efficiently as possible. But what has been done is that President Gadsden has taken control of events, has seized upon this as a psychological moment, when all eyes are focused on, and attention easy to get for, association activities, to give the association a new lease of life; perhaps it would be more nearly to the point to say to give new birth to the association that it may have added life and virility the more effectively to perform not only its past functions but new ones which far-sighted leadership can see are waiting and desirable, yes, even necessary, for it to assume.

The executive committee is behind this program to a man. The special committee which President Gadsden has appointed to make a study of the association's activities and to make recommendations it deems desirable should have the hearty co-operation and advice of the entire membership. Certainly there is assurance that under Mr. Gadsden's leadership it will be a working committee and it should bring in constructive suggestions of value to the association.

There is every indication that the association will thus capitalize its present misfortune and emerge a stronger, more useful force both in the industry and in national affairs.

"Value of Service" as a Valuation Criterion

THE basis of the valuation of the Public Service Railway of New Jersey, as outlined in the letter of transmittal of the engineers, Ford, Bacon & Davis, is one which must appeal to engineers, economists and men in public affairs as being eminently sound and just. This letter was quoted at length in last week's issue of the ELECTRIC RAILWAY JOURNAL. The details of how the various elements or indices of value were arrived at are presented this week. The article shows the figures upon which the engineers have based their judgment; the letter last week gives the theory which has guided the engineers in reaching their conclusion, in balancing the various indications of value in their own mind, in order to arrive at a figure which can be said to represent the value of the railway upon which rates, or condemnation proceedings or purchase might be based.

For, be it understood, two of the most important figures in this work—the operating efficiency and the final value determined—are admittedly, and necessarily, matters of judgment. It will be recalled that the New Jersey law, under which this valuation was made, provided that the valuation declared by the engineers employed by the Special Valuation Commission should be the value of the property in so far as value was an element in fixing rates. The engineers, by law, therefore had the status of a judicial or quasi-judicial body. It was remarked in these columns at the time the work was started that the engineers in charge had an opportunity, and a duty, to advance the science or art of valuation to show what the engineer, with full authority, could do in this most debatable field of engineering, law and economics.

True, some three or four days before the report was filed, the New Jersey Legislature passed an amendment to the law making this valuation subject to review on certiorari and providing that the engineers could be cross-examined on the method and figures by the use of which their final valuation was determined, and further, that the Public Service Commission could offer other evidence as to value; but it was still provided that this valuation be "presumptive evidence" as to the value of the property. However, this valuation was made under the provision of the original law, and it is now pertinent to examine the result to see what has been done by the engineers. It is necessary to consider their summary or basis of valuation separately from that part of the report which shows how the various figures were obtained, as will appear later on.

"Value of service" as the ultimate test to apply in the economics of a regulated public utility is so sound as to require no supporting argument. It is the one criterion applied by extremists of all sorts as well as by more moderate unbiased students. The trouble all comes in deciding what the "value of service" really is. The present instance is a good example of consistent and constant subjecting of each item to the test of whether it contributes to the value of service as interpreted by the engineers who have assumed, rightly, the position of deliberator as well as performing the duties which are more frequently the only ones demanded of engineers. This does not mean that one may not differ with the conclusions reached, however.

Value of service is defined by the engineers as follows:

> The sum of operating expenses, including depreciation and, when necessary, allowances for obsolescence; taxes which are fixed by law, and interest as determined above (defined as being rent of the property whose cost of reproduction has been determined), constitutes the cost of service, and when there is added to this cost profit in an amount sufficient to induce capital to flow into the industry, we have an accurate estimate of the value of the service.

The interest or "rent" becomes at once the debatable item. The object, the engineers say, is to prove the property to have a real value based on the anticipated profits from its use. These profits, in an amount equal to those obtainable in an unregulated industry, safety of investment being equal, must be allowed by any rate-making body or otherwise property would be taken without due compensation.

There can be no question, in view of all past practice and court and commission decisions, of the various items which have been set up to weigh, or consider, in arriving at the final figures. Costs of physical property, and the usual overheads, were determined in the usual way, using inventories made on previous appraisals. Intangibles, as usual, are the items which will cause debate. Of these, the ones which present interesting features are "going value" and "consolidation value." "Power lease," while given a definite value, is discussed with these. They are said to "be represented by the company's income, the market for the securities, etc." It is more than probable that the engineers under the new law will be called upon to substantiate the figures under these three heads.

Going value is a figure increasingly admitted where the development of the business has resulted in early losses or lack of return in early years uncompensated in later years. That the history of most public utilities shows such an item is well known. In this case, the engineers could find no documentary evidence either positive or negative. But they are apparently on firm ground in making a reasonable allowance for this.

Consolidation value is, it is believed, open to more careful examination. If this valuation is carried to higher courts, and this question can be singled out, a decision upon the inclusion of such an item as an independent element of value will be most important to the electric railway industry. Consolidation value is defined in the report as

> that element of value which attaches to a strong unified system as contrasted with the uneconomical condition under which smaller companies, often with diverse interests, operate in the same or adjacent territory.

This element of value is arrived at by capitalizing the estimated savings of the consolidated system as compared with a number of independent companies. Another indication of this figure is obtained by considering the price paid for the component parts of the present property, their physical values and their earning power. There is no doubt that expenditures which have been perfectly legitimate and necessary in the public interest were made to effect consolidations in electric railway systems. It is a question, however, whether it would not be more sound to amortize such expenditures rather than to capitalize them permanently.

This view is strengthened by comparing this treatment of this question with the statement of the engineers that, in their desire to base this value of service on the cost to produce a theoretical modern plant, they use the existing plant of the company, for they say:

> We are of the opinion that it would be impossible to produce a theoretical modern plant at materially less cost than the cost of producing the existing plant of the Public Service Railway.

The power lease, to which the engineers have given a present value of $19,149,000 and a pre-war value of

$11,194,000, is listed among the items which they have considered and weighed in their determination of the final figure of $125,000,000 Its value was determined by capitalizing the savings which were effected by purchasing power from the sister company, the Public Service Electric Company, rather than making it in the plant which was leased to the electric company; to this was added the value of the power facilities turned over. The lease is of value to the railway and its patrons. The arrangement is also said to be of value to the electric company, which practically owns the plant under the New Jersey law. The question naturally arises as to what extent it may be capitalized in both places.

This valuation has been discussed at this length with a view to encouraging further discussion by valuation engineers on some of the points involved. While the ability of the New Jersey Legislature to say that any sum set up by any body created by it is the value of a public utility was questioned when the law was passed, the ideas which the engineers advance in their valuation must have an effect upon a court—such as the Supreme Court of the United States—which may have occasion to pass upon the valuation. It is certain that unusual interest attaches to this valuation and, though some particular items will probably be subject to attack before the new Public Service Commission, or in court, the engineers are to be congratulated upon the constructive work they have done in valuation practice.

Valuation by Legislation and Based on Earning Power

NEW YORK has added an element to the valuation situation which raises two interesting questions. One of these, like that in New Jersey, is to what extent a legislature may lay down any rules or regulations for making valuations. The other is the introduction of "prospective earning capacity" based on a contract rate as a consideration in determining value.

As to the first point, it seems very doubtful that any legislature can lay down any rules for valuation which will have any delimiting effect in case the question of confiscation is raised before the federal courts. If a correct interpretation has been placed on the Supreme Court's decision in the Ben Avon Borough water case (see ELECTRIC RAILWAY JOURNAL, Sept. 25, 1920, page 581) no intricacies of state law or procedure can militate against a utility's having federal court protection against confiscation. Thus the clause in the New York law "but such valuation shall not in any case exceed the fair reconstruction cost of the property less depreciation" is probably without weight and effect.

As to the second point, however, the New York Legislature, by formal enactment, has given recognition, and therefore weight, to the consideration of earning power as an element of value. While the Supreme Court of the United States apparently will not allow any other judicial body or any legislature to exclude any factor from consideration in determining value, it does practically invite suggestions as to other indications of value when it says, in the now famous case of Smyth vs. Ames, "we do not say that there may not be other matters to be regarded in estimating the value of the property."

There is, therefore, nothing out of the way in the New York Legislature's requiring the transit commission to consider the "estimated prospective earning capacity" as an element of value. It may well add to the clarification and crystallization of valuation theory and practice. The exact meaning or interpretation to be put upon the phrase may not be so easily determined until put into practice. Governor Miller has, however, as indicated on another page of this issue, explained his philosophy upon which the statement is based.

Prospective earnings are certainly the principal basis upon which a free purchase of any business is made. That they should have some relation to the value of a property seems self-evident. And it is not so perfectly clear that such a line of argument is proceeding in a circle, either, for, when prospective earnings are estimated, it is on the basis of a rate of fare or value of business which is taken as being fixed—in this case a contracted fare. It cannot be the sole basis of a valuation, but it seems not unsound to consider it as an element or indication.

The City Fare Should Be More on the Interurban Car

PRACTICE universally favors the exclusion of local passengers from interurban cars in terminal cities. On out-bound trips this enables the long-distance passenger to become comfortably seated at the commencement of his journey and also eliminates unnecessary local stops to discharge passengers. In consequence, in-bound cars stop to discharge passengers only.

This is all right so far as it goes, but in Cleveland a further step has been taken. This is to make the fare on the interurban car definitely higher for the city run than on the local car. Such a fare is justified as regards the interurban passenger. The speed is higher, the car is more comfortable and the passenger rides the entire distance to, or from, the city zone limits and is therefore always a long-distance rider. Moreover, such a higher fare will tend to keep the local passenger off. The Cleveland plan looks logical.

Utilities Prove a Millstone to Kansas Industrial Court

THE Kansas Court of Industrial Relations, created as a result of the Kansas coal mine strike in the winter of 1919-1920, was intended primarily to deal with industrial disputes and to make a study of industrial conditions in the state. But in the interest of economy, and since it was a regulatory body as well as a court, it was given, as an "incidental" duty, the functions of the Public Utilities Commission which was abolished. Now, as related in the news columns this week, the Public Utilities Commission is re-created, and the reasons therefore are worthy of comment.

It seems that of almost 700 cases to come before the court all but thirty-five were in the "incidental" line of public utilities. Thus, said Governor Allen, the principal purpose of the court is smothered; the industrial court, which was created to build up the industry of the state and to bring about better industrial relations, is in bad odor with the public because it has had to do the unpopular thing and raise utility rates. Apparently the regulation of public utilities was found by the members of the court, who have performed their duties in a most commendable and high-purposed manner, to be more than incidental.

When the proposal was first made to separate these two functions and create a public utilities commission again, there was a justifiable disappointment that this Kansas experiment of having one body with jurisdiction over both capital and labor might not continue for a longer time. Public utilities have suffered—capital, labor and the public, too—from regulative measures which have had relation to only one of the two factors—rates and wages. Governor Allen points out, however, that only three of the public utilities cases have involved questions of both wages and rates. But, to provide for such contingency, the Legislature empowers the court and commission to sit as one body and decide both wage and rate cases as one. Thus is the principle retained and utilities given the opportunity to have both sides heard at once. Further, with the re-creation of the commission the importance of an able supervision and regulation of public utilities is emphasized.

The London Motor Bus Myth Again

IN PAST ISSUES there has been pointed out the downright mendacity of wildcat motor-bus promoters in attempting to make out a case for their stock-selling schemes by alleged performances of the motor bus in London. So long as such statements are confined to the prospectuses of these modern Wallingfords they deceive only a small number of unthinking investors. It is a different matter, however, when so reputable a paper as the *Boston News Bureau* is deceived into giving space to misleading data, for it is, and has been, copied far and wide by newspapers which cannot be expected to check up the veracity of the items clipped from reputable exchanges.

The item in question was contributed from London by Herbert N. Casson, once a newspaper man and writer on a variety of topics in America but more lately an efficiency magazine publisher among the British. Mr. Casson says in an outburst that recalls his American period: "Last year's figures are a surprise to every one. It appears that the buses are now carrying twice as many passengers as the tubes and four times as many as the street cars."

Well, this is not only a surprise, but a grievous and dismayful shock, for in American ignorance reliance had been placed upon no other authority than that of the Advisory Committee on London Traffic, which reported to the Minister of Transport as follows:

DIVISION OF TRAFFIC AMONG THE VARIOUS TRANSPORT MEANS IN LONDON METROPOLITAN AREA IN YEAR 1919

Suburban traffic on main lines	468,000,000
Local railways	253,000,000
District Railway	140,000,000
Tube railways	266,000,000
Total of non-surface transit	1,127,000,000
Motor-buses	861,000,000
Tramways	1,053,000,000
Total traffic all means of transit	3,041,000,000

Complete figures for 1920 are not yet available. But figures so far received indicate that there is no great variation, for 1920, from the general proportions indicated in this 1919 report.

To contradict so exuberant a transportation authority as Mr. Casson is distasteful, but it is submitted that, except in the company of the Mad Hatter and the March Hare of "Alice in Wonderland," the tramway figure of 1,053,000,000 is larger than the bus figure of 861,000,000 and by all odds is not one-fourth of the bus figures. Now, as a matter of fact, Mr. Casson seems to have come to his conclusion by paying no attention to any transport undertaking outside the pale of what is popularly known as the "London Traffic Combine," namely, the group of underground, bus and tramway lines under the direction of Lord Ashfield, as distinguished from the municipal tramway systems. In fact, a check of the figures in Mr. Casson's original article against those of the Ashfield group alone for 1920 shows that they are identical. Without going into more detail figures, it is true that within the combine itself the motor bus is the greatest carrier, then the underground lines and finally the tramways.

Those who are really familiar with London transport matters know that the tramways of the combine, namely, the Metropolitan Electric, the London & Suburban, the London United, etc., never have been big factors in its operations, inasmuch as these are suburban systems in rather poor territory. On the other hand, they also know that the bus has always had the monopoly of surface transit in the richest areas of London for purely physical conditions that call for no elaboration here. That these tramways, plus the great system of the London County Council and smaller municipal tramways, should be carrying over a billion riders a year is more remarkable than the record of the buses. As Mr. Casson goes out of his way to cast slurs upon the municipal tramways, he must have been aware of their existence; yet he ignores them in his remarkable comparison.

The management of the London General Omnibus Company could not for a moment be assumed to countenance such incomplete statistics as these. As operators, also, of both underground railways and surface tramways, they may be presumed to know something about the relative virtues of each. It is not on record that they are eliminating the subways and tramways that they have, although they are sometimes obliged to parallel their own services part of the way with buses because the latter have the good fortune of starting from the traffic centers, and of course they could not very well stop short on coming to a tramway route. The recent introduction of forty-six-seat and fifty-four-seat buses is in itself a compliment to the seventy-eight-seat tramcar of London (not to mention the London County Council train operation) for they know that the dominant cost item in transportation is platform labor.

In any case, the purpose of this is not to take up the cudgels for the tramcar as against the bus. There is nothing in an antagonism which, in this country, is carried on more to bait the street railways than for any sound technical reason. If the experience of Great Britain means anything to this country there is going to be a great deal of bus operation where the traffic is too thin or too fluctuating to justify a trackway; and such bus operation will naturally be a part of the local street railway system. In London, the motor-bus is doing a wonderful piece of work in mass transportation, and, to a certain extent, also in Paris. But elsewhere in Europe, the bus is an auxiliary and not the whole show nor even a big factor in the total number of passengers carried. As an example, one may quote Liverpool, which is operating scores of buses for certain tie-up and through routes; but which is also planning high-speed right-of-way tramway lines as the most economical method of carrying trunk-line traffic.

In conclusion, it would be utter waste of time to judge the various forms of transit on the basis of financial results during the last hectic years. Street railways, motor buses, subway lines, elevated lines, suburban lines, interurban lines, trunk railways—each and every one of them can show failures galore, but it is not safe to draw any deductions therefrom without a prayerful study of all the factors in the case. Hadn't newspaper writers better leave this subject to those who are earnestly striving to carry the public in the most comfortable and economical manner regardless of whether gas or electric propulsion is used? Why rock the boat in such stormy days as these?

The Cleveland Wage Agreement Points the Way

COMMON SENSE has prevailed among the trainmen of the Cleveland Railway Company and the way has been paved for a wage scale in keeping with the downward trend of living costs. By almost unanimous vote of the unionized conductors and motormen, the company's proposition of a 20 per cent reduction in wages has been approved and working conditions will be adjusted to a more normal basis. The 20 per cent reduction means that the base rate per hour after May 1 will be 55 cents for the first three months' service, 58 cents for the balance of the first year and 60 cents per hour thereafter. This gives hope of building up the interest fund to a point where it will not be necessary to consider another advance in the rate of fare. In addition, changes made in working conditions eliminate extra pay on swing runs due to their spread and reduce the pay for extra work performed on week days from time and one-half to time and one-quarter. No change is made in conditions governing Sunday and holiday work in such cases.

Much credit is due President John J. Stanley for the manner in which he handled this situation. By taking a positive stand months before his contract with the trainmen had expired, he won the support of the people who were interested in having their fares kept as low as possible. He was ready to arbitrate the question in accordance with the terms of the agreement. The employees, sensing the public frame of mind, were not even willing to take chances with a board of arbitrators which might hold them to conditions less to their liking than those offered by the management. They also took a wage scale two cents lower than that which they might have had with an "open shop."

Cleveland has had one of the highest wage scales in the country. Its agreement is expiring earlier than that of many of the larger properties, and the effect of a voluntary acceptance of a 20 per cent reduction in wages by the men should be felt elsewhere. The modified working conditions will also have an appreciable bearing on cost of operation, and the public will get the benefit of service which can be given without the present penalties. Evidence given before the War Labor Board by several companies showed that street railway work cannot be confined to the number of hours which govern in other industries. The nature of the business, the riding habits of the people make this impossible. It should have been apparent, therefore, that it was unfair to penalize the companies for spreading their work beyond a fixed maximum.

Some companies have working conditions even more costly for the management than those prevailing in Cleveland. These should be changed, and the outcome of the Cleveland dispute will doubtless help to bring about the change. The employees had their way when the labor market was "short." Spread of unemployment and ability to get men to work on company terms have turned the scale. A period of deflation is at hand, and the wise employee will accept the offer of the prudent manager in a wage scale which need not be stingy and should not be extravagant. The coming summer should witness a general turn "back to normalcy."

Texas Five-Cent Fare Decision Should Not Be Misinterpreted

THERE are so many statements and comments still being made about the decision of the Supreme Court in the 5-cent fare case of the Public Service Company in San Antonio, Tex., that it is worth while to call attention, again, to the salient facts in the case. The full text of the decision, not available last week, is now at hand and it is apparent that while the decision, being from the Supreme Court, is of nation-wide significance, its direct application depends upon state constitution or law.

What the Supreme Court has said is that San Antonio did not have the power to execute the contract which it tried to execute, or thought it did execute, with the railway company. The company is not, therefore, bound by the terms of the agreement. In the absence of a contract, the city cannot enforce a rate which is confiscatory, as that is against the Federal Constitution. This decision, therefore, while of great significance to the industry is limited in its application to the condition where the city does not have the power to make a binding contract.

The situation where both parties have the power to make a contract was not considered in the San Antonio case but was treated in a decision which the Supreme Court rendered on the same day in the case of three Iowa electric lighting companies. There the court said, in quoting previous opinions in several cases, including electric railway cases in Detroit, Cleveland and Columbus, that where public service corporations and government agencies have power to contract as to rates and exert that power by fixing by contract rates to govern during a particular time, the enforcement of such rates is controlled by the obligation resulting from the contract and therefore the question of whether such rates are confiscatory becomes immaterial.

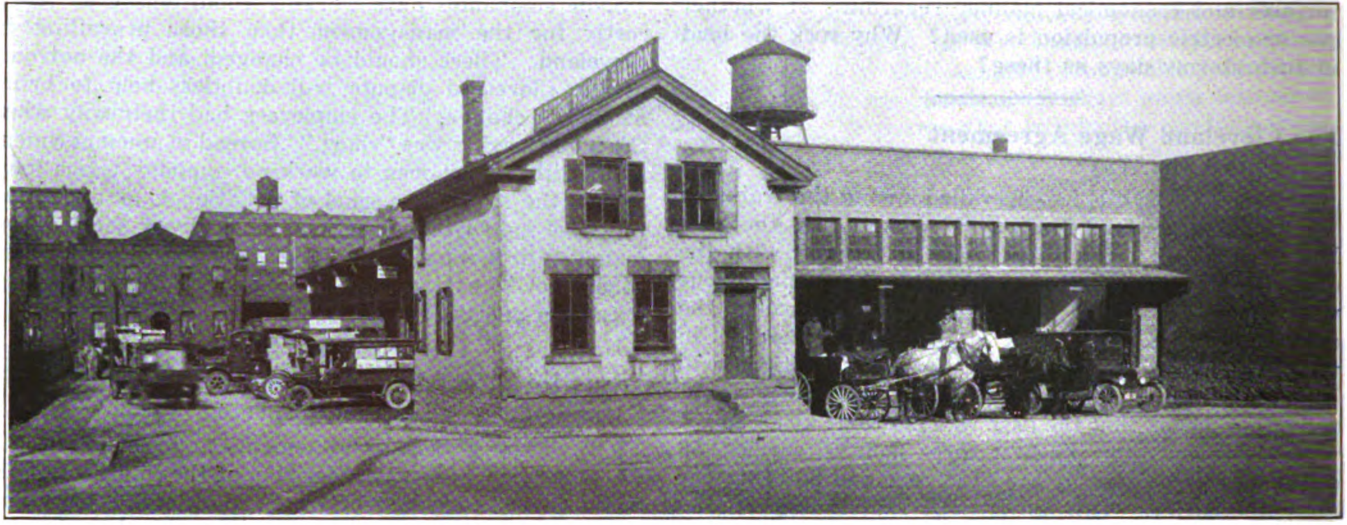
The San Antonio case, then, does not abrogate all franchise rates in the United States; it does not restore valuable property which a man has foolishly sold for less than its worth; but it does give one more assurance that confiscation will not be allowed.

Quotation from the Federal Electric Railways Commission Report

No. 17

THE full co-operation of labor in the street railway industry will not have been brought about alone by the recognition of the right of collective bargaining which we have just been urging. Such recognition is but a foundation for full co-operation. The actual work of insuring it must come from the employees themselves, to whom the right of collective bargaining is thus given. For that right carries with it a duty. It would seem to be the duty of the organization which bargains for the individual worker to interest itself actively and unremittingly in his delivering to the company his best strength and intelligence.

This commission thinks that where the street railway worker has the right of collective bargaining the public has the right to expect that the organization or association representing him will not only procure his wage but will also continuously stimulate his wholehearted constructive co-operation with the company and his effective service to the public.



THE CENTER OF THE ELECTRIC FREIGHT BUSINESS IN ROCHESTER, N. Y.

Freight Co-operation at Rochester

Three Interurbans Are Operating a Union Freight Terminal that Was Designed to Be Simple, Inexpensive and Convenient—It Is Managed by a Board of Three Trustees Who Take the Chairmanship in Turn

BY L. R. BROWN
Office and Field Engineer New York State Railways, Rochester, N. Y.

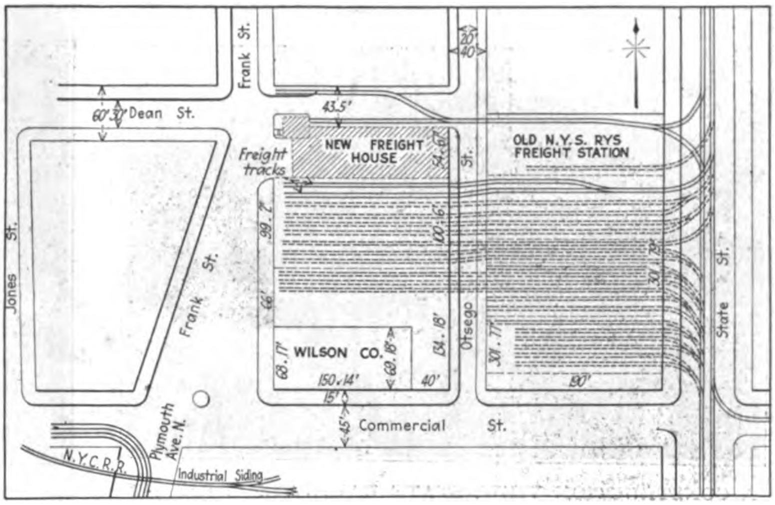
THE New York State Railways, in conjunction with the Rochester & Syracuse Railroad and the Rochester, Lockport & Buffalo Railroad, have just completed and put into operation a union interurban freight terminal. The New York State Railways previously operated electric freight service on its interurban lines between Rochester and Sodus Point and between Rochester, Canandaigua and Geneva, N. Y. The Rochester terminal was located on Otsego Street. It was small and not easy of access and business became very congested at times. The Rochester, Lockport & Buffalo Railroad operates between the cities from which it takes its name and serves also several small cities and villages located on its line. This company had previously conducted electric freight service in conjunction with the Rochester & Syracuse Railroad, with a station located near the Erie Railroad freight station on Exchange Street, Rochester. This station was about 1 mile from the station of the New York State Railways. The Rochester & Syracuse Railroad operates between Rochester and Syracuse and many small cities and villages on its lines.

These three electric railway companies entered into a ten-year agreement whereby the first cost of the terminal was borne proportionately by each, and the yearly operating cost is assigned on the basis of the tonnage handled by each during the year. Each company appoints a trustee to care for its interests in the terminal. The trustees meet once a month. One member is elected as manager for a year and thus each company has the managership every third year. B. E. Wilson, general passenger and express agent New York State Railways, is the present manager.

The new union electric freight station is located between Frank and Otsego Streets in Rochester. It is in the rear of the New York State Railways' State Street carhouse and offices and only one block from the Kent Street freight station of the New York Central Railroad. The electric freight cars have access to both sides of the terminal by means of spur tracks leading from the tracks of the New York State Railways in State Street. Teams and trucks have access to one side and one end of the freight station, with entrance on both Frank and Otsego Streets. The new building, as shown on the accompanying plan, adjoins a carhouse of the New York State Railways and the wall of this was used as a wall of the new building. Five openings were cut through this wall at convenient locations to fit the doors of the various cars and two of the carhouse tracks next to the new freight house were taken over as freight tracks. The second track can only be used "loading through" cars standing on the first

RECEIVING SIDE OF THE NEW TERMINAL

track. The location of these loading doors is shown in the construction photograph. As the cars used by the three companies are of various lengths and heights, some having center doors and others having two side doors near the ends, the openings in the walls were located by the aid of car templates so that any of these cars could load or unload next to the freight house at the same time. Pits on one of the tracks provide opportunity for inspection of the cars while in the station.



FREIGHT TERMINAL IS LOCATED CONTIGUOUS TO NEW YORK STATE RAILWAYS CARHOUSES

DURABILITY A FEATURE IN THE DESIGN

The building itself is 170 ft. long and 54 ft. wide. The outside walls are of brick. The building is one story high and has a Barrett specification tar gravel roof laid on 1⅝-in. matched roof boards. The timber roof is supported by wood posts which form nine bays, the distance between posts being 18 ft. The bottoms of the posts rest on concrete piers containing cast-in dowel pins. The piers extend down to the original soil. The bottoms of the wood posts supporting the roof are protected from trucking by angle irons secured to each of the four corners. All exposed corners of brick work are protected in the same manner.

The floor of the freight house is of concrete, 6 in. thick, the surface being protected from trucking by the use of Ironite, a mechanical hardener. The entire floor was laid on a freshly made fill about 3½ ft. deep. This was done to bring the floor up to the level of cars and trucks. The fill was compacted by the puddle method. Each load of earth was spread and thoroughly soaked with water from a fire hose. The fill was made slowly while the rest of the work was going on, and the teams driving over the surface helped compact the fill. The concrete floor was the last part of the construction to be done. It was built in alternate blocks after the outside doors were hung. No expansion joints were used.

A two-story brick residence, left standing on the property, was incorporated into the freight terminal for use as an office and warmroom. This was one of nine residences which stood on the property. The others were removed to provide space for the freight terminal. The basement of the residence provides room for the heating plant and quarters for the freight handlers. The ground floor is occupied by the cashier's office and the warmroom, as well as a washroom and toilets for the men. The second floor has rooms for the billing clerks and bookkeepers and a restroom for the women clerks. A dummy waiter between the cashier's office and the billing clerk upstairs saves many steps.

The main freight room is divided into two parts by a strong slat fence. This separates the inbound from the outbound freight. Each village or city which has considerable freight traffic is allotted a portion of the floor which is properly designated by signs. Portable desks are provided near the doors so that clerks can check off goods received in or sent out of the terminal. Two sets of automatic scales are provided of five tons capacity each. These are both located in the outbound end of the terminal. The foundations of these scales can be seen in the construction photograph.

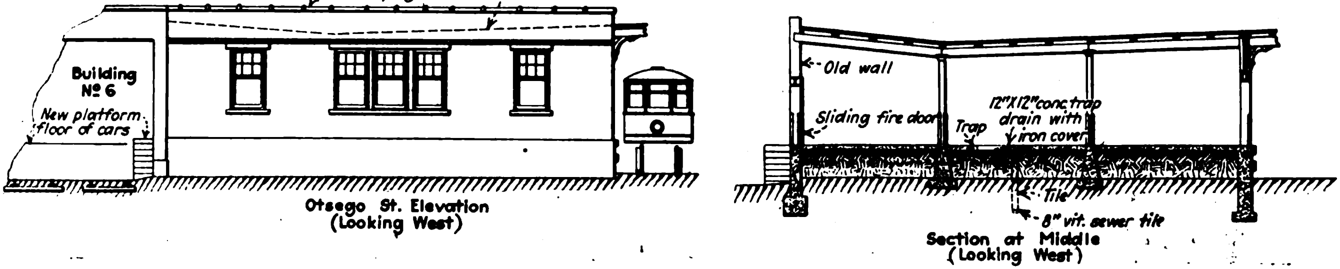
Light is admitted to the building by windows in the east end and by windows over the doors extending the full length of the north and west sides. Skylights, the use of which was contemplated in the original design, were omitted on account of expense. The building as designed was intended to be the cheapest possible, taking into consideration the appearance and use.

SOME OTHER STRUCTURAL FEATURES

For fire protection a sprinkler system has been installed to protect the freight-house offices and cars from fire. The openings between the buildings are protected by tin-clad sliding fire doors. The outside doors, which occupy the full length of the north and west sides, are of the sliding folding type, being made of parallel cypress. The stiles are two inches thick. Gas pipe guards have been erected to protect the doors from trucking when they are folded back into the open position. The doors are very easily and quickly operated.

The new union freight station is located just across Otsego Street from the old New York State Railways freight station. Electric freight cars pass through the old station to reach the new terminal, thus making it very convenient to utilize the old station as an overflow for the new station should occasion require. A photograph is shown of the old station and another of the new one taken from the roof of the old station.

An important feature of the terminal is the large



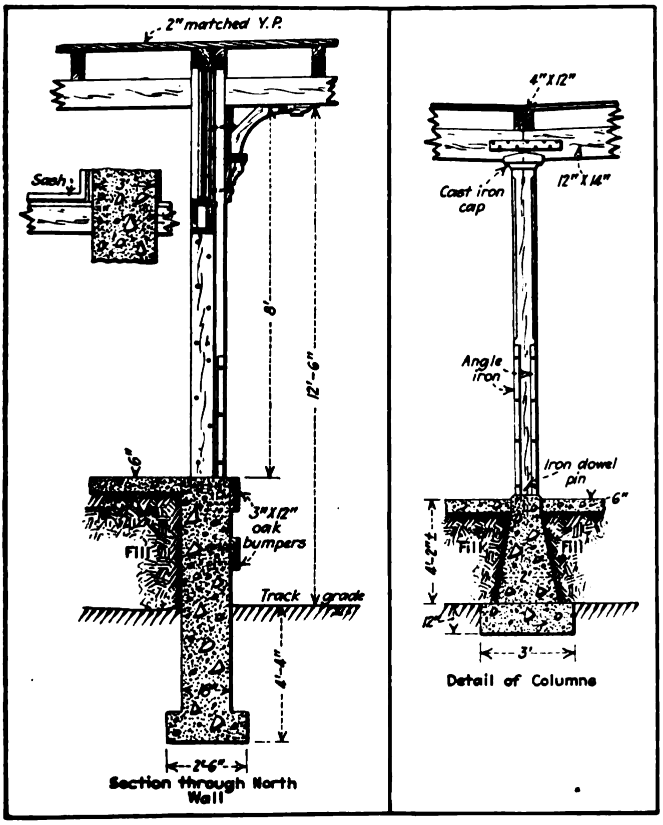
Otsego St. Elevation (Looking West)

Section at Middle (Looking West)

ELEVATION AND CROSS-SECTION OF TERMINAL REPRODUCED TO SUGGEST STRUCTURAL DETAIL

A CONSTRUCTION VIEW, STATE RAILWAYS CARHOUSE IN BACKGROUND

OLD ELECTRIC FREIGHT STATION REPLACED BY NEW TERMINAL



SOME CONSTRUCTION DETAILS OF THE ROCHESTER ELECTRIC FREIGHT TERMINAL

paved area provided for the use of teams and trucks. The entire yard is paved with concrete, thus eliminating the muddy conditions which existed at the other terminals at certain times of the year. This paved area provides a space about 40 ft. wide in front of all the doors, as well as a passage between Otsego and Frank Streets. The west end of the station is set back 20 ft. from the street line, so that trucks backed up to the station will not block the sidewalk on Frank Street.

"USE FACTOR" OF BUILDING IS HIGH

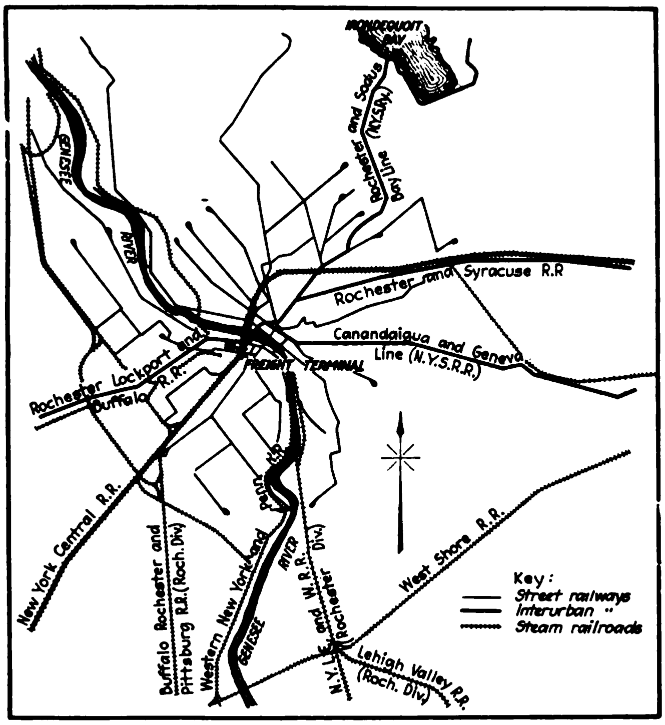
The terminal is operated on a twenty-four-hour basis, openings on the north side of building being used for teams and trucks in the daytime and for cars at night. Including the team track along the north side of the property, eleven cars can be loaded or unloaded in the terminal at the same time. This does not include the old station space between State and Otsego Streets, which will hold seven other cars. In the daytime, when there are no freight cars loading on the north side, twenty teams or trucks can back up to the doors and load or unload at the same time.

The arrangement of tracks provides for the transfer of freight with minimum amount of handling. The location of the two tracks side by side makes it possible to transfer freight direct from one car to another. The tracks on the north side of the freight house facilitate loading direct from truck to car or vice versa. The track on the extreme north side of the property provides for the "setting in" of a box car or trailer which

THIS FREIGHT HAS BEEN WEIGHED AND AWAITS SHIPMENT

TYPICAL FREIGHT SHIPMENTS READY FOR LOCAL DELIVERY may require more than one day to load or unload. The location of tracks on both sides of the building eliminates much truckway, as freight brought in on cars at night can often be left near the doors, whence it will be taken away by trucks in the morning.

This union electric freight terminal furnishes the needed link properly to provide western New York with electric freight service. Through rates are now established between all places on these lines between Syracuse and Buffalo. Trailers can be used for less-than-carload lots or transfer can be easily made, as explained, at the new terminal. It is expected that the union station will effect a reduction in the terminal costs of the companies and increase the general freight business of each of the roads concerned.


Irondequoit Bay
Genesee River
Rochester and Sodus Bay Line (N.Y.S.Ry.)
Rochester and Syracuse R.R
Canandaigua and Geneva Line (N.Y.S.R.R.)
Freight Terminal
Rochester Lockport and Buffalo R.R.
New York Central R.R.
Buffalo Rochester and Pittsburg R.R. (Roch. Div.)
Western New York and Penn. R.R.
Genesee River
N.Y.L.E. and W.R.R. (Rochester Div.)
West Shore R.R.
Lehigh Valley R.R. (Roch. Div.)
Key:
Street railways
Interurban "
Steam railroads

INTERURBAN LINES WHICH CONVERGE AT NEW ROCHESTER FREIGHT TERMINAL

The plans for the terminal were prepared by the writer.

Greatest Living Engineers

AN INVESTIGATION recently conducted by the American Association of Engineers as to the relative standing of prominent engineers discloses among others the following results: Among electrical engineers C. P. Steinmetz heads the list, while Elihu Thomson, Thomas A. Edison and Alexander Graham Bell form a group following closely thereafter. B. G. Lamme, Frank J. Sprague and Bion J. Arnold are also well up on the list. First and second respectively on the civil engineers' list are General G. W. Goethals and Prof. George F. Swain, while the corresponding ratings are given to John A. Brashear* and Orville Wright for the mechanical engineers, Herbert C. Hoover and John H. Hammond for the mining engineers, and Leo H. Baekeland and W. R. Whitney for the chemical engineers.

The above ratings were made by the deans of a number of engineering and scientific schools.

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*Dr. Brashear died after the making of the canvass. Ambrose Swazey was tied with Mr. Wright for second place.

Detroit's Motor Bus System

Twenty-eight Motor Buses Being Operated on Two Routes, Having a Maximum Possible Haul of 13 Miles for a Flat 10-Cent Fare—Policy of the Company Is of a Constructive Character

DETROIT'S population of 1,000,000 was carried two and one-half times by an average of twenty-one buses during the first seven months of operation of the motor bus system established there in June, 1920. The report of the Detroit Motorbus Company for the period ended Dec. 31, 1920, shows gross earnings of $253,599 and net earnings of $20,051 after setting aside $24,310 as a reserve for depreciation of equipment and $5,688 as a reserve for injury and damage claims.

Service was started on June 11, 1920, between Grand Circus Park and the Detroit water-works, via Woodward and Jefferson Avenues, a 5-mile run, with eight buses on an eight-minute headway. At the present time twenty-eight motor buses are operating on a six-minute headway over 13 miles of street. The Jefferson Avenue route has been extended east to the Continental Motor factory (1.5 miles) and north on Cass Avenue to Amsterdam Avenue (2.5 miles). An additional service is operated via John R. Street, Piquette and Amsterdam Avenues and Second Boulevard, from the City Hall to Boston Boulevard (5 miles). This route connects with and transfers to the Cass and Jefferson Avenue route at the Amsterdam Avenue terminal.

Operation is authorized by the city of Detroit under a general motor bus ordinance approved by the City Council Dec. 26, 1917, and amended May 26, 1919, licensing the operation of motor buses on all the streets and parkways of the city except those of Belle Isle Park. The company has no franchise. The ordinance provides that any license issued thereunder shall be subject to renewal or revocation. It also provides for amendment or alteration. Under these conditions a company that was not confident of its ability to render acceptable and popular service would not be likely to undertake it.

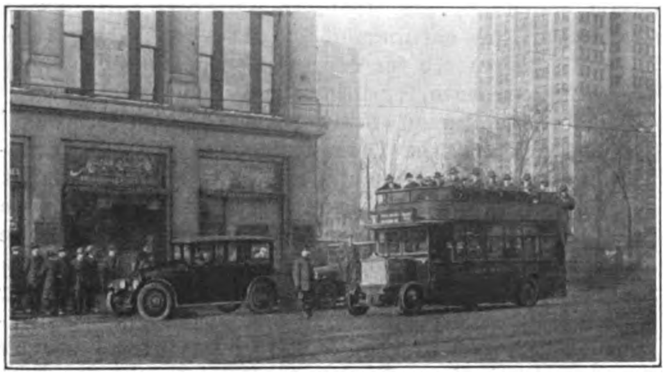
Like any other common carrier in Michigan, the bus company is subject to commission regulation.

DETROIT MOTOR-BUS COMPANY
INCOME STATEMENT—JUNE 11 TO DEC. 31, 1921

	Actual	Per Bus-Mile, Cents	Per Cent of Total Revenue	Per Cent of Total Operating Expenses
Operating revenues:				
Passenger fares	$250,280	40.15	98.70	.....
Omnibus hire	455	0.07	0.17	.....
Advertising	2,864	0.46	1.13	.....
Total	$253,599	40.68	100.00	.....
Operating expenses:				
Maintenance of plant and equipment	$16,865	2.71	6.65	7.32
Reserve for depreciation	24,310	3.90	9.58	10.55
Conducting transportation	155,351	24.94	61.26	67.47
Traffic expense	2,171	0.35	0.85	0.94
General and miscellaneous	25,837	4.14	10.22	11.25
Reserve for injuries and damages	5,689	0.91	2.24	2.47
Total	$230,223	36.95	90.80	100.00
Net operating revenue	23,376	3.73	9.20	10.13
Taxes, license fees, etc. (a)	1,027	0.16	0.40	0.45
Income from operation	$22,349	3.57	8.80	9.68
Miscellaneous income	160	0.03	0.06	0.07
Gross income	$22,509	3.60	8.86	9.75
Deductions	2,458	0.39	0.97	1.07
Net income to profit and loss	$20,051	3.21	7.89	8.68
Passenger traffic:		Number		
Revenue	2,502,800	4.015	.....	.....
Transfer	236,005	0.379	.....	.....
Total rides	2,738,805	4.394	.....	.....
Bus-miles run	623,385	......	.....	.....
Per cent of buses in daily use	97	......	.....	.....

(a) Exclusive of federal income and profits taxes.

During the spring and summer of 1921 it is planned to increase and extend the service. The Jefferson Avenue line is likely to be extended to the city limits on the east and to have a downtown terminal at Grand Circus Park as originally. A Cass Avenue and Second Boulevard line will run from the Windsor Ferry at the foot of Woodward Avenue to Boston Boulevard. An additional service on this line starting from the ferry will diverge at the West Grand Boulevard and run west to Grand River Avenue. An additional service on the Jefferson Avenue line will diverge at the East Grand Boulevard and run north to the Packard factory. The John R. Street line will probably be extended straight north on John R. Street to Boston Boulevard. These extensions will be made possible through the receipt of forty additional buses of the Detroit low type, which can operate safely with passengers on the upper deck under the viaduct of the Michigan Central Railroad, which has vertical clearances over the streets it crosses of but 12.5 feet.


DETROIT LOW-TYPE BUS WITH LEFT-HAND DRIVE

DESIGN OF BUSES

The Detroit bus was developed by the New York Transportation Company (which owns the Fifth Avenue Coach Company of New York and controls the sale of the vehicles it manufactures) for service on streets where the overhead clearances precluded the use of the standard Fifth Avenue type. With the exception of the height, the bus is similar in appearance to the standard Fifth Avenue bus, but has a left-hand drive.

So successfully does the Detroit bus meet the special problems of low overhead clearances that the tallest man sitting on an upper-deck seat will have at least 6 in. clearance above the top of his hat while passing under the railroad viaducts. The same man standing on an upper deck could not possibly reach a railroad trolley wire at its standard height.

The bus occupies less than 3.75 sq.ft. of street space for each passenger carried and weighs only 223 lb. per passenger capacity. It can be turned completely around in a 60-ft. street without backing. The stepless platform is 14 in. above the pavement and 8 in. above the sidewalk. Route numbers are carried on roller curtain destination signs on the front of the bus and also at the right of the entrance. In winter the lower deck is heated by the exhaust from the engine and the heat is regulated by a hand valve.

On the lower deck ten stationary cross seats, with rattan coverings, provide places for twenty passengers facing forward. A bulkhead seat allows space for two additional passengers riding backward. A bright and cheerful interior is obtained by the use of 100 sq.ft. of glass and white enameled ceiling. The windows are of the drop sash type and practically convert the lower deck into an open car when it is desired in warm weather.

On the exposed upper deck, which has a capacity of twenty-six passengers, wooden slat seats, each seating two, arranged seven on the right side and six on the left, are used, due to the impracticability of obtaining a weatherproof, self-draining spring seat. Each seat on both decks is equipped with a push-button signal for the convenience of the passenger in signaling the driver at alighting points.

FARES AND TRAFFIC

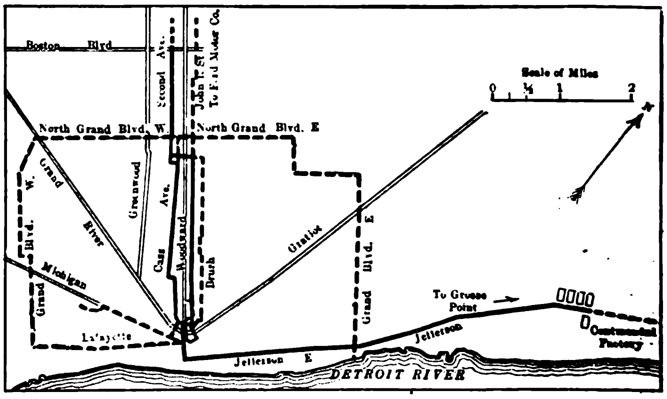
Operation is conducted under the flat fare system, with the base rate 10 cents. Free transfers are issued to connecting routes for travel in the same general direction. Every passenger is provided with a seat, and no standing in the aisles or on the platform is permitted. Smoking is allowed only on the upper deck of the bus.

Transfer regulations provide that transfers are good only to the person to whom issued, and no other, for a continuous trip on the first bus on which there is a vacant seat upon either deck under the usual conditions of time and direction.

The system of fare collection follows the "collect within" principle and utilizes the Rooke automatic register.

The traffic that has been developed by the buses is surprising. During the less than seven months of 1920 they carried 2,502,800 cash passengers and 236,005 transfer passengers or a total of 2,738,805, or at the rate of 591 cash passengers per day per bus, or 215,715 cash passengers per bus per annum. The bus mileage that was made during this period was 623,385.1. The percentage of buses owned that were in operation daily throughout the period was 97 per cent. The table gives a detailed analysis of operations and the cost of service on a bus-mile basis.

The general policy of the company has been constructive in character, aiming to supplement the street railway service rather than compete with it, and as far as possible to supply service on the thoroughfares not served by any street railway line.



BUS ROUTINGS IN DETROIT, FULL LINES SHOW PRESENT ROUTES—DOTTED LINES SHOW PROPOSED EXTENSIONS

In more than five million safety-car miles in Terre Haute, Ind., the railway company has had only six cases of motor trouble—four armatures and two fields.

Method Used in New Jersey Valuation

An Analysis Showing How the Reproduction Costs on Two Price Bases Were Determined and Used in Reaching the Value of $125,000,000 for Rate-Making Purposes—Property as a Whole Found Well Maintained — Operating Efficiency of the Physical Property and Organization Is Set at 86 per Cent

IN DETERMINING $125,000,000 to be the value of the operative physical property and business, exclusive of franchise value, for rate-making purposes of the Public Service Railway of New Jersey, Ford, Bacon & Davis, engineers employed by the New Jersey State Valuation Commission, prepared two separate reproduction-cost appraisals on different price bases. They also considered the historical cost or investment in the property since its inception. Using average pre-war prices ruling from the period between 1910 and 1915, the value determined was $88,815,887 with accrued depreciation amounting to $14,382,789, as against $189,489,560 with accrued depreciation of $32,784,505 if prices as of Sept. 1, 1920, had been used. The historical cost as found amounted to $119,150,263.

The unamortized cost of superseded property amounted to $4,701,943, while the reproduction cost of non-operative property was $502,713 at pre-war prices and $645,593 when Sept. 1, 1920, prices were used.

The outstanding securities of the railway amount to $165,066,556, divided as follows: Common stock, $83,038,000; preferred stock, $1,166.500; bonds, $79,235,016, and equipment notes, $1,627,000.

An inspection of the physical property indicated 80 per cent condition. In the judgment of the engineers the operating efficiency of the property and organization was placed at 86 per cent.

In determining the reproduction values the detailed physical inventory prepared by Dean M. E. Cooley as of Dec. 31, 1915, which had been previously checked in many details by the New Jersey Public Utilities Commission engineers, was used as a basis. Additions since that time, which were principally for rolling-stock, were taken from the company's records.

The reproduction cost new valuation made by Cooley was based upon average unit prices extending over the five-year period from 1911 to 1915 inclusive. With additions to capital from Dec. 31, 1915, to Jan. 31, 1920, the total value amounted to $88,165,858.

WHAT THE VALUATION INCLUDES

The present valuation embraces the entire electric railway system of 832.92 miles of track owned or operated under leases of 900 years or more by the Public Service Railway Company; the properties of the Riverside & Fort Lee Ferry Company; the Port Richmond & Bergen Point Ferry Company; the Peoples Elevating Company; the Jersey City Wagon Elevator; the Public Service Terminal in Newark; the property installed by the Emergency Fleet Corporation in Newark, Kearney and Camden, and the value of the tracks and overhead prior to relocation in Camden which the government has agreed to restore to its old location at the expiration of the government's use of the property. None of the property of the Public Service Railway Company is included.

TABLE I—GENERAL TRACK STATISTICS

Miles of Track Operated	Girder Rail	Low T-Rail	Total
Special work	67.84	16.48	84.32
Straight track	488.58	260.02	748.60
Total	556.42	276.50	832.92
Equivalent rail tonnage	77,452	32,987	110,439

TABLE II—ROLLING STOCK OWNED

	Closed Cars			Open Cars		
	Four Motor	Two Motor	Trailers	Four Motor	Two Motor	Total All Kinds
Double end, double truck	696	171	..	106	31	1,004
Single end, double truck	(a) 585	248	..	257	48	1,138
Double end, single truck	...	79	..	...	121	200
Safety-cars, double end, single truck	...	195	..	...	...	195
Trail cars, double truck	...	...	1	...	...	1
Electric locomotives	...	...	..	...	...	....
Service and work cars, all kinds	...	...	..	...	...	284
Total	1,281	693	1	363	200	2,822

(a) Includes fifty-one single-end, double-truck, four-motor cars paid for by U. S. Shipping Board Emergency Fleet Corporation but used in the operation of the Public Service Railway and to be purchased by the company.

TABLE III—ESTIMATED COST OF REPRODUCTION NEW—NON-OPERATIVE PROPERTY

(Account 404)

	Pre-War Prices	Sept. 1, 1920, Prices
Land	$341,875	$341,875
Buildings	100,552	227,556
Structural overhead costs	55,303	71,179
Property to revert (a)	4,983	4,983
Total	$502,713	$645,593

(a) Two buildings are on land owned by the railway company which is leased to others. The buildings will revert to the company at the end of the lease and the amount, $4,983, shown is the present worth of an amount of money which at 8 per cent compound interest will equal the estimated value of the buildings at the end of the lease.

TABLE IV—MISCELLANEOUS INFORMATION

	Unit	Quantity	
Poles:			
Wood	No	25,927	....
Iron	No	19,958	45,885
Cross-arms:			
Wood	No	25,569	....
Iron	No	3,525	29,094
Insulators	No	....	76,058
Strain insulators	No	....	53,938
Lightning arresters	No	....	2,071
Span wire	Ft.	....	1,698,721
Trolley wire	Lb.	....	1,824,141
Feeder wire	Lb.	....	9,850,345
Trolley cars	No.	....	39,923
Rail bonds	No.	....	160,570
Rails:			
Girder	Tons	77,452	....
Low T	Tons	32,987	110,439
Ties:			
Untreated	No.	1,294,204	....
Treated	No.	696,827	1,991,031
Stone ballast	Cu. yd.	....	682,369
Paving—Class A:			
Rectangular block	Sq. yd.	1,214,636	....
Belgian block	Sq. yd.	434,228	....
Brick	Sq. yd.	145,304	....
Wood block	Sq. yd.	119,058	....
Asphalt block	Sq. yd.	15,071	....
Asphalt	Sq. yd.	105,798	2,034,095
Paving—Class B:			
Macadam	Sq. yd.	1,076,751	....
Amesite	Sq. yd.	4,438	....
Tarvia	Sq. yd.	59,545	....
Telford	Sq. yd.	227,545	....
Bitulithic	Sq. yd.	2,244	....
Cobble and rubble	Sq. yd.	81,549	1,452,072
Total paving	Sq. yd.	....	3,486,167
Concrete foundations	Sq. yd.	....	246,637

The power generating system, including main stations, substations and transmission lines, together with certain real estate which were leased on July 1, 1910, to the Public Service Electric Company for 999 years, was excluded, as the property in question is not used directly by the railway in its operation. Federal courts have construed that such long term leases under New Jersey laws are for all practical purposes conveyances of the property. The actual investment in power stations, however, up to the time of the lease is included in the historical cost figure.

The inventory was classified according to the State of New Jersey Board of Public Utilities Commissioners' uniform system of accounts for street railways. In certain cases the value of property that was used jointly for railway operation and other purposes, such as the Terminal Building in Newark, has been included in its entirety in the account covering operative property, it being assumed that in fixing a rate base, incidental receipts from rentals of such property would be taken into account.

Miscellaneous physical property held for rent and other property which is not anticipated will be required within any reasonable period for either maintenance or operation was included in Account 404. All construction and equipment items of a special and incidental nature which could not be properly charged to any other account are included in Account 550-B "Miscellaneous construction expenditures."

The Cooley appraisal as of Dec. 31, 1915, was used as the basis for detailed inspection and measurement after being spot checked in sufficient detail to verify accuracy. Additional charges to plant since that time were obtained from the company's construction records, and verified as to character and condition by inspection. These capital additions up to Jan. 1, 1921, amounted to $1,514,260. One-man safety cars, trailer cars and service equipment totaled $1,479,342 of this amount.

Two bases of prices were used to obtain an appraisal of the property in terms of pre-war money and present-day money. The pre-war prices were generally the average of prices ruling between 1910 and 1915. Present-day prices were those current Sept. 1, 1920.

All land was appraised by real estate men. Prices fixed were based on normal market values for the highest general use. Strictly special use, such as for railway purposes, was not considered or allowed for. Locality value, the value of adjoining or neighboring land, were considered. Allowance wherever justified was also made for plottage or assemblage, continuity and special adaptability, although only bare land values as of the normal grade were used. Cuts and fills were considered as improvements.

The estimated cost of plots, abstracts, notarial fees, recording deeds, etc., as well as assessments levied by public authorities, amounts payable for construction or improvement of roads, streets, etc., were added to the appraisers' bare land value.

Overhead charges were defined as expenditures made for the work as a whole and which could not be apportioned accurately among the various inventory items.

Pre-construction costs embrace the formulation of the initial plan and interesting a group of individuals sufficiently strong to bring the project to maturity; the preliminary legal and technical studies; the securing of title and franchises; the legal and technical presentation of the project to secure financial interest, and the securing of options.

An examination of the company's books and records, previous experience in similar research for other properties of the same character, as well as recognition of the fact that in most cases when financial interest has been secured there is usually a reorganization or settlement involving a recognition of profit to the original projectors and developers, showed these costs to amount to 2.1 per cent of the reproduction costs based on present-day prices and 3.3 per cent of the reproduction costs under pre-war conditions.

The construction period was construed to begin when the financial interest had been secured. Before actual construction can begin, it is necessary to secure an ample and complete supply of materials and to negotiate many of the necessary contracts. Six months is taken as an estimate of the time necessary. To construct the whole property it was estimated would take from four to five and one-half years.

The administrative organization laid out to carry on this construction was divided into six parts, namely, administrative, legal, engineering, construction and purchasing. The allowance for administration and legal expenses was found to amount to 1.75 per cent of the reproduction costs exclusive of real estate based upon present-day prices and 2.5 per cent under pre-war prices. Real estate expenses were estimated at 3 per cent under current prices and 2 per cent for pre-war costs.

The engineering work was construed either to have been handled by a staff organized by the company or an established engineering firm. In either case the cost would be about the same for actual results. In addition the employment of consulting engineers would be necessary to perfect and insure the design of all parts of construction and equipment. The services of architects and local engineers would also be necessary. A weighted allowance of 3.5 per cent of the reproduction cost exclusive of real estate under present prices and 5 per cent under pre-war prices was used. Engineering and superintendence for the real estate under present-day conditions was estimated at 0.8 per cent, while for pre-war conditions 0.5 per cent was used.

Interest during construction was treated as the net interest accruing on construction expenditures before the property for which expenditures were made is placed in operation and as each portion of the road went into service the interest account was relieved of that portion. Interest was estimated at 6 per cent for pre-war prices and at 8 per cent for present-day basis. Funds, it was estimated, must be on hand for an average of a month and a half before disbursement. Two per cent per year was allowed for estimated bank balances.

In calculating taxes during construction credit was allowed for that portion of the road which would go into operation each year and the tax account relieved to that extent. The average amount of taxes was found to be 0.9 per cent of the reproduction cost for each set of prices.

Financing expenses cover services, expenses and reasonable profits thereon in connection with the wholesale and retail marketing of securities. Such expenses are estimated in per cent of the total funds required and the allowances were based on actual experiences of the Public Service Corporation, upon similar data determined for other companies and upon the judgment of experts in this line of business. Based on the foregoing 7.5 per cent was allowed for present-day prices and for the reproduction costs under pre-war conditions 5 per cent.

PERCENTAGE ALLOWANCES FOR GENERAL OMISSIONS AND CONTINGENCIES

Account	Way and Structures	Per Cent
504	Grading	2
510	Track and roadway labor	5
514	Elevated structures and foundations (foundations only)	10
515	Bridges, trestles and culverts	3
516	Crossings, fences and signs	3
517	Signals and interlocking apparatus	3
518	Telephone and telegraph lines	3
519	Poles and fixtures	5
520	Underground conduits	5
521	Distribution system	5
524	Stations, miscel'aneous buildings and structures	3
525	Wharves and docks	5
	Equipment	
530	Passenger and combination cars	0.5
532	Service equipment	0.5
533	Electric equipment of cars	0.5
534	Locomotives	0.5
536	Shop equipment	3
538	Miscellaneous equipment	3

So far as they reflect quantities, unit prices, incidentals and contingencies, an allowance for omissions was included in quantities and unit prices. Except for the construction and equipment accounts, additional allowances have been made for general omissions and contingencies which were not covered in the quantities and unit prices. The percentages so allowed and listed above cover expenses corresponding to a contractor's carrying charge, charges made during the progress of construction, strikes on the work and delays affecting the delivery of materials or prosecution of work, omission in cases of scattered property difficult to inventory, collateral work on outside structures not now apparent, such as relocation of other pole lines, etc., and delays due to legal obstruction.

The inspection method was used to get the determination for accrued depreciation. Obsolescence was allowed only where replacement could be definitely foreseen. Obsolescence due to future improvements in the art was not considered.

INTANGIBLE ELEMENTS OF PROPERTY

The intangible elements of property, that is, the elements not represented by physical property, are represented by the company's income, the market for the securities, etc. Four elements as defined below were considered.

In determining "going value," four to five years was considered a reasonable time in which to build up the business and to perfect the organization. It was impossible, however, to determine from the records kept by the company the actual cost of developing the business. It became necessary therefore to make certain assumptions. These were based on the piecemeal plan of construction, variable rising wages, operations continually shifting, requiring changes in the amount of service for different districts. Actual expenditures incurred in carrying the organization and eliminating the weak and inefficient elements therein were merged in the operating accounts. Then, too, no record was kept of the inadequate return on investment during early operation.

Weighing these points, it was found that on the basis of present-day prices for labor and material the cost of going value amounted to 8 per cent of the reproduction cost of the physical property and based upon prewar prices it amounted to 6 per cent.

Consolidation value is defined as the element of value which attaches to a strong unified system as contrasted with the uneconomical condition under which smaller companies operate in the same or adjacent territory. The element of value due to consolidation in the existing system is estimated by comparing its operation with that of a number of smaller independent companies. Savings due to consolidation should result in more efficient routing of cars, reduction in maintenance and fixed charges on excess trackage, reduction in the cost of maintenance of equipment by passing the work through consolidated shops in larger quantities and reduction in equipment investment. Inspection of car operations can be put under a single head, as well as way and structure maintenance. A large company has more ability to secure money usually at cheaper rates of interest than smaller companies.

Savings in the larger consolidations involving 117 companies were estimated in detail and amounted to a total of 3.65 per cent of the total cost of service. In the cases of other consolidations involving only a dozen or more companies the saving was estimated at 1.89 per cent of the cost of service.

TABLE V—ESTIMATED COST OF REPRODUCTION NEW—OPERATIVE PROPERTY, PUBLIC SERVICE RAILWAY

		Pre-War Prices		Sept. 1, 1920, Prices	
		Reproduction	Accrued Depreciation	Reproduction	Accrued Depreciation
501	Engineering and superintendence	$2,660,869	....	$4,191,732	....
502	Right of way	4,430,845	....	4,781,863	....
503	Other land	6,001,837	....	6,001,837	....
504	Grading	2,477,857	$625,887	6,091,060	$1,549,813
505	Ballast	1,360,685	160,292	2,599,673	320,497
506	Ties	1,533,631	720,584	3,634,570	1,707,062
507	Rails, rail fastenings and joints	5,381,808	1,561,918	10,237,305	2,972,485
508	Special work	2,561,894	995,542	4,937,945	1,918,866
510	Track and roadway labor	2,717,178	853,859	6,938,434	2,180,516
511	Paving	6,260,165	2,435,524	14,312,086	5,675,349
512	Roadway, machinery and tools	85,253	24,581	159,880	46,384
513	Tunnels and subways	217,867	10,893	471,145	23,557
514	Elevated structures and foundations	595,572	75,321	1,269,267	148,143
515	Bridges, trestles and culverts	1,339,031	168,452	2,662,677	313,339
516	Crossings, fences and signs	187,005	21,586	387,667	44,808
517	Signals and interlocking apparatus	202,812	57,161	458,731	129,552
518	Telephone and telegraph lines	50,791	15,198	122,939	36,797
519	Poles and fixtures	1,090,651	358,769	2,584,225	827,281
520	Underground conduits	395,056	59,215	961,581	144,142
521	Distribution system	3,431,267	579,887	6,323,816	1,069,128
522	General office buildings	2,847,529	217,003	6,259,725	477,858
523	Shops and carhouses	3,176,003	992,471	7,539,477	2,342,833
524	Stations, miscellaneous buildings, etc.	419,990	98,815	983,702	231,795
525	Wharves and docks	552,356	175,732	1,346,027	430,851
530	Passenger and combination cars	7,226,120	1,805,446	17,704,251	4,423,407
532	Service equipment	457,889	114,403	1,145,627	286,235
533	Electric equipment of cars	5,110,462	1,333,831	12,108,732	3,160,380
534	Locomotives	6,834	1,754	17,001	4,379
535	Floating equipment	773,160	537,702	2,242,164	1,559,334
536	Shop equipment	550,061	186,914	1,199,133	407,472
537	Furniture	240,405	83,932	458,919	127,092
538	Miscellaneous	124,185	54,255	188,256	82,248
546 550	Law expenditures Administration expenses	1,513,006	....	2,376,242	....
547	Interest during construction	5,301,194	....	14,558,074	....
549	Taxes during construction	619,620	....	1,236,063	....
550	Miscellaneous:				
	(a) Preconstruction costs	2,066,023	....	2,689,735	....
	( ) Auxiliary operation items	172,403	55.862	438,739	142,902
	(c) Financing expenses	3,738,400	....	11,485,100	....
	Additions to capital account	628,173	....	1,514,160	....
	Going value	4,710,000	....	13,170,000	....
	Consolidation value	5,600,000	....	11,700,000	....
	Total	$88,815,887	$14,382,789	$189,489,560	$32,784,505

NOTE—The above totals for accrued depreciation were increased by 2.63 per cent for present-day prices and by 3.75 per cent for pre-war prices, representing one-half of the structural overhead costs for engineering and superintendence and for administration and legal expense to obtain the totals shown in the table given in the ELECTRIC RAILWAY JOURNAL April 16, 1921, page 747.

Setting aside that percentage from the cost of service in 1904, following the general consolidation in 1903, gives total savings of $361,500 as of that time, which if capitalized at 6 per cent equals $5,160,000. To this should be added $440,000 covering the subsequent additions, making a total of $5,600,000.

In arriving at the element of consolidation value applicable to reproduction under present-day prices, the estimate for pre-war prices was increased in proportion to the increase in physical value as compared with pre-war prices, thus allowing only for the decreased purchasing power of the dollar.

In addition to the savings accruing to consolidation the element of consolidation value can also be evidenced by expenditures made to effect the consolidation. Expenses on account of this element were determined by considering the price paid for a given property, the cost of the physical property, and the earning power. Expenditures made to effect the principal consolidations based on these considerations was estimated to have been at least $7,300,000.

The book value of the railway power facilities turned over to the electric company under the 999-year lease of July 1, 1910, was approximately $5,169,000. This was less than the reproduction cost new of such facilities based upon prices for labor and material prevailing at the time of the lease.

During 1920 the railway company paid $3,992,000 for electrical energy furnished under this lease. This amount included an allowance for interest at the rate of 8 per cent on power facilities turned over July 1, 1910, and the actual interest paid the electric company in accordance with the lease on additions made by the electric company.

The cost to the railway company of producing and delivering an equivalent amount of energy from a modern plant was estimated at $5,000,000, thus indicating a saving through the power lease for the year 1920 of $1,119,000, which capitalized on an 8 per cent basis amounts to $13,980,000. Adding this amount to the book costs of facilities turned over to the electric company makes a total of $19,149,000 for present-day prices.

Under pre-war prices the saving through the operation of the power lease amounted to $492,000, which capitalized at 8 per cent amounted to $6,025,000. This then added to the new book cost of facilities totaled $11,994,000.

In view of the fact that this lease is between two companies controlled by the same holding company, these profits add no specific value to the lease. The potential value, however, has been given consideration.

WORKING CAPITAL

The allowance for working capital was defined as the requisite amount of materials and supplies it was necessary to carry in stock to meet the regular demands for operation and maintenance of the property. To this should be added a sufficient amount of cash to meet promptly all payrolls and bills presented.

The value of supplies carried on Jan. 1, 1921, amounted to $1,520,709. The amount of free cash on hand should equal at least one month's operating expense, which amounts to $1,860,567. Adding these totals gives $3,381,276 as the amount of working capital necessary.

The actual investment as of March 31, 1919, as determined by Mark Wolff on behalf of the New Jersey State League of Municipalities at the time of the zone fare hearings was $93,662,873. Additions and corrections were made in this figure to bring it up to Jan. 1, 1921, as follows:

Historical cost:		
Estimate of Mark Wolff as of March 31, 1919		$93,662,873
Add—Payments omitted 1893 to 1898 to B. M. Shanley account of:		
Consolidated Traction Company	$420,515	
Orange & Passaic Railway	658,000	1,078,515
		$94,741,388
Deductions—		
Account of three errors of transcription	$1,072,980	
Substitution of actual figures for estimates on costs in several cases	376,545	1,449,525
		$93,291,863
Add capital additions on books of company to Dec. 31, 1919		2,562,245
Add corrections made in overhead allowances on original estimates changed from 3.5 per cent 19.7 per cent of total expenditures, which includes overhead costs equivalent to 10 per cent on construction expenditures—April 1, 1919, to Dec. 31, 1920, to cover financing expenses and interest and taxes during construction amounting to $256,224.		14,862,840
		$110,716,948
Less $2,000,000 paid railway on assumption of power lease plus correction error of $123,315		$1,876,685
Total historical cost		$108,840,263
Add intangible values not shown on books—		
Going value	$4,710,000	
Consolidation value	5,600,000	10,310,000
Total value definable as historical cost		$119,150,263

SUPERSEDED PROPERTY

The value of superseded or abandoned property, not including salvage of the existing railway company and its predecessor companies prior to the end of their useful life, amounts to $4,701,943. An itemized list of this property follows:

Horse cars, cable, dummies, buses, etc		$2,620,000
Subsequent to electrification:		
Track	$652,064	
Power plant equipment	344,097	
Distribution system	49,926	
Car and equipment	652,673	
Abandoned track	68,479	1,767,239
Total		$4,387,239
Fare zone expense		314,704
Total		$4,701,943

An analysis by accounts on both reproduction price bases follows, together with other pertinent information concerning the physical property owned by the company.

Avoiding Transfer of Surety Bonds

IT IS now possible to bond the position instead of the individual employee. This plan of bonding all responsible positions was recently entered into by L. T. Hixon, auditor Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., with the result that the annoyance of having to transfer a bond from one person to another whenever there is a change in employees is eliminated. The company simply takes out a blanket bond, covering all bonded positions listed in an attachment made a part of the bond, for the amount specified for each position. The portion of the bond covering any particular position may be discontinued, or the amount covering a new position added on, at any time by deducting or adding the corresponding amount to the rate. This type of surety bond, which is understood to be a new development of the service of the National Surety Company, is said to be very liberal in character and to be available at practically the same rate as the old type individual bonds. The blanket bond is simply renewed yearly and that is about all the attention required.

Don't Hate Your Customers

A Talk to the Platform Men of Georgia Railway & Power Company by Its President

Preston S. Arkwright

Delivered March 31, 1921

I HAVE often wondered what you motormen and conductors think of the work you are doing. You get up early in the morning, many of you before day, frequently in the cold of the winter—you have done it many days before. You go down to the barn, get out your car, same car you got out yesterday, take it out on your route, over the same old street you ran on yesterday, and the day before that. You turn on and off the current, put on and off the brakes, running along a familiar street that you have run on many a time before, to the end of the line. You pick up the controller handle, walk through the car to the other platform, then run back over the same route to the other end of the line. Then you pick up the controller handle, walk through the car to the other platform and come back again.

The conductor rides with you on the back platform, ringing the bell for you to go, ringing the bell for you to stop, calling out the same old streets, when he calls them out at all. And so you go, five, seven, nine and eleven hours every day, day after day, month by month, year on year, in the rain, in the cold, in the sleet, Sundays, holidays, Christmases, finally reaching home again, late in the night, some of you in the early hours of the next morning. Oh! the dreary monotony—if you think that way about it.

Even at that it's no more monotonous than most other jobs.

How would you like to be a bookkeeper, perched on a high stool making figures in books all through the day, day after day and year after year, seeing nothing but figures, engaging in no activities of any kind, simply recording figures of the results of work that other men do?

How would you like to be a mechanic turning threads on bolts, doing nothing else but this, shut up in the shop all day, just turning threads on bolts all the time, day after day?

YOUR JOB IS WHAT YOU MAKE IT

How would you like to run an elevator, up and down the shaft, seeing nothing of the outside, just up and down the same shut-in shaft all the time. I know a man who does this very kind of work and he is the happiest and most cheerful man I know. He runs the elevator in this company's own office building. He makes it his business to make things brighter for everybody that works in the building. You really ought to go up and take a lesson from him.

As I say, if you think that's what your job is then that's what it is, and if you let your mind dwell on the monotony of it then you will not only never amount to very much at it, but it will drive you crazy some day.

If you'll take the right view of it you'll find your work altogether different from this. You are furnishing transportation service for a whole city. We people of Atlanta are very proud of our growth from a little crossroad village reduced to ashes in the Civil War to a city of over 200,000 inhabitants. This couldn't have been done without you—you made this growth possible. You've got more right to be proud of this city's growth than any other single enterprise in it. You've taken the greatest part in bringing it to pass.

We are very proud of the Candler Building, for instance, and the other sky-scraping office buildings that mark out the skyline of the town. The people who built them took especially great pride in them, so much so that they gave them their names; Candler Building, Hurt Building, Grant Building, etc. These buildings couldn't exist without the work that you do. You transported the mechanics who put them up, you bring back and forth the tenants that occupy them. So you have had a part in the building of them. Your work entered into it.

RAILWAY MEN HELP ALL BUSINESSES

We are very proud of our fine churches. Atlanta has an unusual number of fine churches, with eloquent preachers and large Sunday congregations. These churches couldn't exist in the numbers they do except for the work that you are doing. There would be no congregations for eloquent preachers to preach to if you didn't bring them in. Why, the very reason you can't go to church yourselves is in order that there may be congregations for churches to hold.

You bring the teachers and the children to the schools. You are helping to educate the children of the community. They couldn't come to the schools except for the work that you do. So that your work, in part, is the education of children.

Mr. Howard recently erected a very fine theater that's an ornament to the city. He is very proud of his theater, as he has a good right to be. The whole city of Atlanta takes pride in pointing to the theater Mr. Howard built. You helped to build this theater. You brought the mechanics to the job, you bring the audiences to see the pictures. There couldn't be any theater without the work that you do. There wouldn't be enough people here to sustain it, and they couldn't get to it except for your work.

You take the workmen to the shops maintaining the equipment that runs on the railroad. You run our cars all night taking the train crews to and from the railroad yards, and you bring the passengers to and from the stations. You have a part in the transportation system of the country.

There are many beautiful residence suburbs around Atlanta. There are thriving, growing, prosperous suburban towns, such as Decatur, East Point and College Park. Where would they be but for the work that you do? People couldn't live in the suburbs. They would be huddled in dark, unsanitary, congested tenement houses except for the work that you do.

So all of the activities of the community, its entire prosperity and well-being and growth depend on the basic fundamental service that you are doing. You are not simply turning controller handles and ringing bells. You are making possible the city and all of its activities and you have a share in the accomplishment of everything worth while that anybody does here. This is why you have to get up in the morning before anybody else. This is why you have to stay at work until everybody else has gone to bed. This is why you work on Sundays, holidays and Christmases. There couldn't be any other work in a city of this size but for your work and there wouldn't be any Sundays or any holidays or any Christmases that people could enjoy.

You have got a right to be proud of the work you do. There is no other so necessary, so useful or so valuable.

I don't know why it is, but I think it is true some people look down on street car men. I don't know what the cause is. Maybe its a hangover from the days when we drove a mule; or because our transactions are in little money; or because we're so poor.

Perhaps we are responsible for it ourselves. I think we have had a low estimate of our work and a poor opinion of ourselves. Nobody is going to think any more of us than we think of ourselves, that's sure. If we think we are common trash, then other people are going to think we are common trash, and common trash we are and will remain. So, above all, have a good opinion of yourselves and a good opinion of the work you are doing. Take a pride in it.

YOU HAVE A POSITION OF RESPONSIBILITY

This company has confidence in you and trusts you. It puts in your charge the car, which is pretty valuable, costing from $5,000 to $15,000. It trusts you with its money. It trusts you with its responsibility for damages. It trusts you with its reputation.

The public has confidence in and trusts you. They trust their own lives and safety to your care. They put their wives and little children in your charge, confident not only that you will save their persons from injury but will protect them from all harm.

You have a position of trust and responsibility and are performing a work of great importance.

Don't go at it just as a temporary or despised job to make a living out of. If you feel you've got to eat to live, that you've got to make a little money to eat and that's why you do this work you are not going to get any happiness out of it and nobody is going to have any respect for you.

Sometimes we think the public is unfair and unjust to us. At times we are apt to believe they are our enemies. I won't let myself think that and don't you let yourselves think that. It isn't true. They are not our enemies, but whether they are or not don't think that they are. If you believe that the public are your enemies then you are going to be an enemy to the public, and if you feel that way about it, or if I feel that way about it, we are unfit to stay in this business. We are unfit to serve people if we are unfriendly to them.

These people are your customers. You are furnishing transportation for pay. They are paying to ride on your car. *Don't hate your customers.* If you were running a grocery store or a dry goods store or a clothing store would you hate a person who came in to buy things that you sold? Now you *are* running a store. You've got charge of the car. You want people to ride with you. You want them to pay to ride with you. You ought to feel friendly with them when they do ride with you. Show your friendliness to them. Be glad to have them get on your car. Have a spirit of welcoming them. If you will show friendliness to them they will show friendliness back to you.

I have never myself been discourteously treated by a motorman or conductor. I have never witnessed discourteous treatment by a motorman or conductor of any other passenger. As a matter of fact I have very rarely been discourteously treated by anybody. Generally I think it is our own fault when we are discourteously treated. I know that some motormen and conductors do treat passengers discourteously. Sometimes I think it is due to the fact that some passenger regards the motorman or conductor as a menial servant. He shows this in his treatment and naturally you resent it. Sometimes you have got a chip on your shoulder and you take offense when no offense is intended, or you've got a grouch and you take it out on the passenger. Naturally he comes back at you.

COURTESY MUST BE INSTINCTIVE

Be considerate of passengers. This doesn't mean that you've got to apologize for living or that you must adopt a cringing attitude. It simply means that you are to put yourself in the passenger's place and treat him in the manner you would like to be treated by him. I am not talking about rules of etiquette. Pretense of good will or veneer of manner or slobbering over people is not going to get by. You've got to have the right spirit about it. You've got to like the work and want to do it properly in order to do it right. If you will get the right spirit all forms and rules of politeness will take care of themselves.

You run these cars every day and a lot of the same people ride with you day after day. You know them. Show that you know them. Learn their names, speak to them by their names. There is nothing that flatters people more than to be recognized and called by their names.

You come in contact with a great many people. This company transported about 95,000,000 passengers last year, or about 260,000 a day. In the early morning you meet the mechanics going out to construction jobs; you carry the people to the mills and factories and workshops; the clerks and business people and sales people to the offices and stores and business houses; you bring in the school teachers and the children to the schools and colleges; then come the women to shop in the stores; you carry people all day long on their various missions of business or pleasure or social intercourse. In the afternoons here come your passengers trooping back from the factories, the mills, the buildings, the shops, the schools, the stores and the offices. You bring the husband back to the wife at night and the mother back to the children. You reunite the families at home. You bring them out again to the amusements in the evening. You've got a part in all their various activities. Not only this but your treatment influences their happiness and the character of their work.

If you are grouchy in the morning you pass the grouch on to the men and women who go into the factories, the mills, the shops, the schools, the offices or the stores. You spoil their day. They pass on the grouch they have got from you to the people they come in contact with. If you pass your grouch on to the returning passengers at night they pass it on to the home circle. If you are cheerful and happy you will better the work and the lives of all of these people you transport and all of the people they come in contact with. Nobody made us engage in this work, nobody keeps us in it against our will. If we don't like it let's get out of it. If we stay in it let's be happy about it.

You owe it not only to yourselves and to the company, but you owe it to all the other men in this business with you to have the right attitude and spirit toward this work and to conduct yourselves so as to deserve the respect and good will of the public you serve.

Sometimes in an organization this large a dishonest man will creep in. The passengers notice this man knocking down fares. They immediately say that all street railway conductors are damned thieves.

Sometimes the motorman or conductor will be uncouth and rude or even insulting, we'll say, to some lady passenger. The passengers who observe it will say that all motormen and conductors are boors.

Whatever one motorman or conductor does reflects on all the other motormen and conductors. So not only get the right attitude yourselves but interest yourselves in seeing that all the others have the right attitude. If there are those among us who are not fit to be here let's run them off. Let's raise the public's estimation of the street car man.

If we have respect for ourselves, the proper appreciation of the work we are doing, and the right attitude toward our customers, we will deserve the respect of the public and their co-operation and support. And when it comes to pass that we shall get them—as it surely will—how happy we shall be.

British Railway Electrification Situation

Standardization of System and Equipment Recommended—Electrification Advocated as Most Economical Method of Reducing Terminal Congestion and of Increasing Capacity of Suburban Lines

IN ENGLAND, much more than in the United States, it is realized that if the electrification of the railways is to be undertaken on a large scale some standardization of system and equipment will be necessary. A great step in the direction of uniformity was made by the recommendation last year of the Ministry of Transport, in the opinion of London *Engineering*, that direct current at 1,500 volts should be generally adopted for the electrification of the British railways. It is to be hoped that this decision will put an end to the battle of the systems. Anyway, a reasonable decision is better than none at all.

Sir Philip Nash, in a paper recently read before the Institute of Transport, sums up briefly the British situation in regard to electrification. It appears, he said, to be taken for granted that the general replacement of steam locomotives by any system of electric traction on the trunk lines of England is far beyond the range of practical policy at present. The chief point for immediate consideration is the extent to which railway operation would be benefited by the electrification of suburban lines and large city terminals. There are also certain cases where special conditions of the line or of the traffic may indicate electrical operation to be best, but, generally speaking, the center of interest lies with suburban passenger traffic.

At the same meeting, Sir Herbert Walker, in advocating further electrification, said that the traffic on the electrified portion of the London & Southwestern Railway had increased from less than half a million passengers a week in 1915 to more than a million per week today. During the same period the operating costs of the electrified lines had increased by only 100 per cent, although the corresponding cost of steam-operated lines had increased by 200 per cent.

A somewhat similar story was told by Sir William Forbes with respect to the Brighton lines. Electrification had enabled the mileage run to be increased by 150 per cent with an increase of 200 per cent in earnings. The financial result had been a return of more than 15 per cent on the capital spent in electrification. The company was putting forward proposals at that time for the electrification of the Brighton main line, although the return on the fresh capital required for this conversion would be but 6 or 7 per cent.

The real factor which is doing more than anything else to keep the question of electrification strongly before the English railway companies is the ever-increasing difficulty of handling suburban, and especially terminal, traffic with steam-drawn trains. It is said that 1,200 trains per day enter and leave Liverpool Street station, London, and in spite of capable organization on the part of the railway officials and good humor on the part of the public, the conditions at times have been almost intolerable. The traffic has outgrown the facilities of the station, and the experience of the railways like the Southwestern shows that many more passengers are ready to travel if a sufficient number of trains is provided. Electrification may be costly as a solution for this difficulty, but when the only alternative is the enlargement of the whole station and the duplication of track and platform, the installation of electrical equipment may be decided upon merely as the lesser evil. Moreover, the incidental advantages of electric operation at terminal stations in cities are by no means negligible.

In regard to the general railway situation in England, the lines are in a run-down condition. A recent report made to settle the accounts between the government and the roads deals largely with the arrears of maintenance of normal wear and tear and replacement of stores. No less than 2,100 fewer locomotives were given heavy overhauls in 1919 than in 1913, though the light repairs to keep these engines at work numbered about the same for these years. Heavy repairs on other equipment, such as coaches and freight cars, were in a like proportion. This condition seems to point to the fact that though the stock was kept running, it was yet decidedly behindhand in upkeep.

Capital expenditure, which for many years before the war used to run to about £10,000,000 per annum, amounted to only £12,500,000 altogether between 1913 and 1919 for Great Britain and £700,000 for Ireland. The total mileage of the railways of the country in 1919, reduced to single track, was 56,000, about 800 miles more than in 1913, the increase being nearly all in sidings.

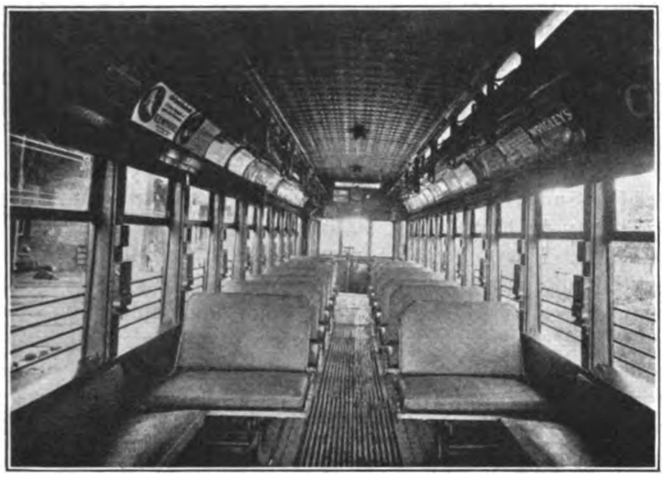
The most noticeable item, in the report mentioned above, under the heading of "Modes of Traction," is an increase of 2,732,000 engine-miles by electric traction due to the improved electric services.

Machine Sells Gum to Railway Passengers

Novel Vending Device Proves Profitable—Its Use Brings Out Fact that One Passenger in Twenty-five Will Buy 5-Cent Packages of Gum on Cars

SELLING gum to street railway passengers is a new pastime, but it is being done with success in Little Rock, Ark. Two or three years ago, J. H. Mann, Jr., of Pine Bluff, Ark., conceived the idea of building a machine to sell a standard 5-cent package of gum, rather than the 1-cent pieces so frequently sold. In wondering where to place such machines, it occurred to him to place them on street cars. A machine was developed, and a number of them were tried out experimentally for several months on some of the cars of the Little Rock Railway & Electric Company. Finally a satisfactory foolproof machine was evolved. It is designed to lock against the depositing of a coin if the machine is empty, and also to prevent the insertion of a blank or slug.

For more than a year, about 1,200 of these machines have been in successful operation on the cars in Little Rock. A demonstration was made on ten cars of the Dallas Railway which resulted in a contract for the installation of about 3,000 machines on the Dallas cars. Arrangements have been made for a test run at Knoxville, Tenn., and several other systems at this time are considering having demonstrations made.



INTERIOR OF A CAR WITH VENDING MACHINES PLACED ON WINDOW POSTS

The statistics of the past year in Little Rock are of interest. An average of forty-eight cars were equipped during the year, and on these a gross business of more than $27,000 was recorded. From this, of course, the number of 5-cent sales could be calculated and when this number was compared with the total number of passengers riding on those cars it was found that 4 per cent of all the cash-fare passengers riding on the cars so equipped had purchased gum.

The proposition which the manufacturer makes to the railways is to pay them a percentage of the receipts for the privilege of installing the machines in the street cars.

These vending machines are manufactured and distributed by the Transit Vending Machine Company, Pine Bluff, Ark., and another corporation, the Transit Sales Company, operates them. The operating company maintains the vending machines, fills them at night and extracts the coin when the cars come into the carhouse. On a basis of 10 per cent of gross receipts to the railway, the manufacturer estimates that a railway company operating 100 cars might expect to receive from this source a revenue of approximately $7,500 a year.

More recently, the machines have been loaded with mints of the "Life Saver" variety, which seem to sell as effectively as gum. The machine, which weighs 3 lb., is built of steel. It is bolted to the posts between car windows.

Wages on the Steam Railroads

SO MUCH has appeared in the daily papers in regard to hearings on steam railroad wages that an official statement by the Association of Railway Executives is welcome. This is given in Table II and shows the figures relating to representative classes of railway employees under "national agreements," with the increase in number of these employees and increase in compensation. The increase in the number of men employed is largely due, in the opinion of the Association of Railway Executives, to rules and working conditions which reduced the output per man and were introduced while the railroads were under government control.

TABLE I—PERCENTAGE INCREASES OVER 1914 OF WAGES OF STEAM RAILROAD EMPLOYEES AND COST OF LIVING

Year	Per Cent Increase in Average Wage Over 1914	Per Cent Increase in Cost of Living Over 1914
1915	1.83	2 (Dec.)
1916	9.31	15 (Dec.)
1917	23.04	32.2 (Dec.)
1918	73.89	69.3 (Dec.)
1919	81.74	93.5 (Dec.)
1920*	121.32	113 (June)
1920†	134.07	94.5 (Dec.)

* Before wage award. † After wage award.

The statement made by the Association of Railway Executives also includes a table of increases in wages since 1914 with percentage increases in cost of living as reported by the National Industrial Conference Board and by the Bureau of Labor. These figures are shown in Table I.

TABLE II—SHOWING INCREASE IN NUMBER AND PAY OF REPRESENTATIVE CLASSES OF STEAM RAILROAD EMPLOYEES UNDER NATIONAL AGREEMENT

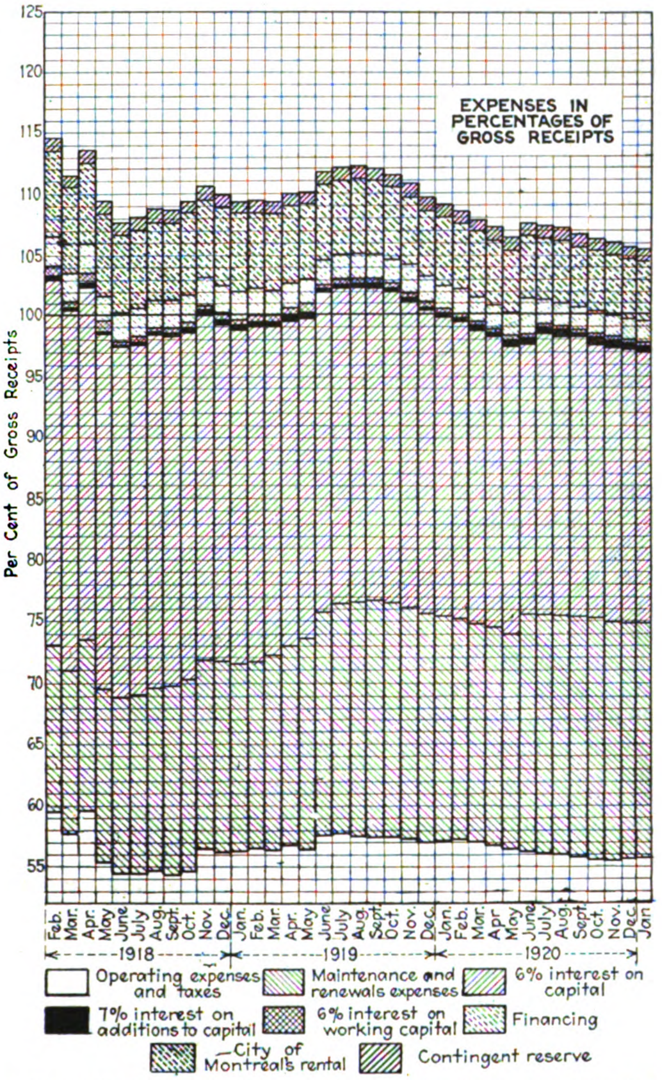
Class of Employees	Number in Service 1917	Number in Service *a* 1920	Increase 1920 Over 1917, Per Cent	Average Annual Compensation, 1917	Average Annual Compensation, *b* 1920	Increase 1920 Over 1917, Per Cent
General foremen—M. E. dept	1,549	1,859	20.0	$1,661	$3,039	83.0
Gang and other foremen—M. E. dept	18,043	25,488	41.3	1,352	2,786	106.1
Machinists	41,112	64,861	57.8	1,394	2,382	70.9
Boilermakers	12,931	20,504	58.6	1,425	2,473	73.5
Blacksmiths	8,115	10,807	33.2	1,258	2,237	77.8
Painters and upholsterers	11,087	12,223	102	950	2,029	113.6
Electricians	9,564	14,460	51.2	1,030	2,335	126.7
Air brake men	5,904	8,064	36.6	1,086	2,350	116.4
Car inspectors	19,661	26,349	34.0	1,141	2,425	112.5
Car repairers	66,531	89,239	34.1	993	2,116	113.1
Other skilled laborers	52,989	59,733	12.7	1,065	2,229	109.3
Mechanics' helpers and apprentices	86,021	129,757	50.8	822	1,638	99.3

a First quarter, 1920. *b* July wage award included for twelve months.

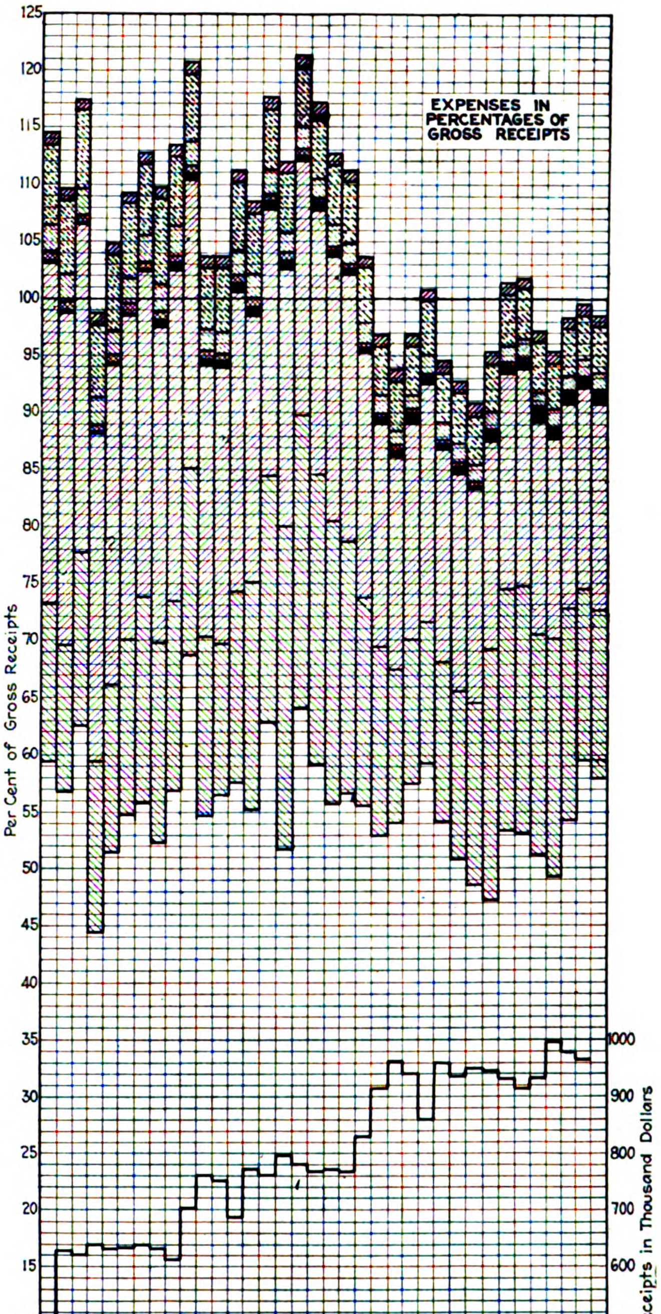
Service-at-Cost Results in Montreal

AT THE Ottawa convention of the Canadian Electric Railway Association, held Jan. 31 and Feb. 1 and covered in the issue of this journal for Feb. 5, Col. J. E. Hutcheson read a paper on the results secured under the service-at-cost franchise in Montreal. He exhibited some charts, two of them in colors, which showed the data in concrete form, these charts having been prepared for the Montreal Tramways Commission. The charts were not available for publication at the time, but arrangements to this end were made later and the data were brought up to a considerably later date than those shown in the convention. For the reader's convenience the graphs have been combined to render them more readily comparable and they are reproduced on this page.

In both charts the expenses are itemized under eight heads, the percentages being laid off one above the other in the following order: Operating expenses and taxes, maintenance and renewal expenses, 6 per cent interest on capital, 7 per cent interest on additions to capital, 6 per cent interest on working capital, cost of financing, rental due city of Montreal and contingent reserve. For convenience these are expressed in terms of gross receipts, the actual monthly values of which, to January, 1921, are given in the right-hand column. Referring to the right-hand chart, it will be noted that since November, 1919, the gross receipts have usually exceeded the expenses, so that a substantial reduction in the deficit was made during 1919. This deficit was accumulated while the actual authority of the commission to regulate fares was being determined in the courts. Colonel Hutcheson stated in his paper that the earnings per passenger were as follows: Feb. 10 to Sept. 30, 1918, 4.09 cents; Oct. 1, 1918, to Oct. 31, 1919, 4.80 cents; Nov. 1, 1919, to Aug. 31, 1920, 5.85 cents; Sept. 1 to Nov. 30, 1920, 6.09 cents.



CUMULATIVE EXPENSES UNDER MONTREAL FRANCHISE ITEMIZED, EXPRESSED IN PERCENTAGE OF CUMULATIVE GROSS RECEIPTS



DETAILS OF OPERATION UNDER MONTREAL FRANCHISE, MONTH BY MONTH

At top, itemized expenses expressed in percentage of gross receipts. At bottom, gross receipts in dollars per month.

American Association News

EXECUTIVE COMMITTEE DECIDES AGAINST EXHIBITS AND WILL ANNOUNCE CONVENTION CITY SHORTLY—APPOINTMENT OF NEW SECRETARY POSTPONED PENDING REPORT OF COMMITTEE ON PLAN AND SCOPE—NATIONAL ELECTRIC RAILWAY DAY TO BE CELEBRATED MAY 4

Executive Committee Holds Important Meeting

Settles Question of Convention and Will Make Study of Organization of Other Associations Before Appointing Secretary

AT A MEETING held in New York on April 16 the executive committee of the American Electric Railway Association decided to appoint a committee to study carefully the needs of the association and of the industry so as to make the association of greater benefit to all of its members than it has been in the past. The opinion was generally expressed that at this time and before a successor to Secretary Burritt should be appointed it would be most desirable to make such changes in the organization as might adapt it better to efficient work and to get such suggestions as might be available from the working of other national associations of somewhat similar character. For this reason the appointment of a successor to Mr. Burritt was postponed, pending the report of a new committee of twelve, whose selection was left to President Gadsden. At the same meeting it was decided not to have exhibits at the convention this year, but no definite decision was reached on the place for the convention.

The meeting was held at the office of the association and the members of the executive committee in attendance were:

President P. H. Gadsden, Philadelphia; Vice-Presidents Britton I. Budd, Chicago, and C. D. Emmons, Baltimore. Members of the executive committee, E. F. Wickwire, Mansfield; H. R. Mallison, Montreal; J. N. Shannahan, Hampton; W. H. Sawyer, East St. Louis; R. P. Stevens, New York; W. G. Gove, Brooklyn; John J. Landers, York, Pa. Past-Presidents W. Caryl Ely, New York; T. N. McCarter, Newark; Charles L. Henry, Indianapolis; L. S. Storrs, New Haven; John J. Stanley, Cleveland; C. L. Allen, Syracuse; George H. Harries, Omaha. Others in attendance included Frank W. Frueauff, New York; M. B. Lambert, Pittsburgh; Joseph K. Choate, New York; J. G. Barry, Schenectady; James H. McGraw, New York; S. M. Curwen, Philadelphia; Henry R. Hayes, New York; B. C. Cobb, New York; M. R. Boylan, Newark; H. G. Bradlee, Boston; J. D. Mortimer, New York; E. C. Faber, Chicago, and A. M. Robinson, Philadelphia.

AUDIT PRACTICALLY COMPLETED

President Gadsden opened the meeting by declaring that the audit of the accounts of the association had now been practically completed and he is anxious to have those in attendance as well as the members at large understand exactly what had been found and what was being done to avoid any defalcation in future. He explained that it has been the custom of the association for the past fifteen or twenty years to have the books audited in the fall of each year by members of the auditing department of the Public Service Railway of Newark, N. J. When the time came for the audit last September, the auditors were requested by the former bookkeeper of the association, W. O. Gibson, to wait so that the books could be written up. Several other attempts were made to conduct the audit, but an excuse of one kind or another was made by Gibson in each case. When a start was made, it was found that the books had not been written up since June. President Gadsden was immediately notified by telephone, and further examination by the auditors showed that there had been defalcation. When confronted by the evidence, Gibson admitted that $31,000 had been taken. The plan was that when he wanted money he would secure the signature of the secretary, who had perfect confidence in him, to a bank voucher and then would make no return of the voucher. The largest amount taken on any single voucher seems to have been $5,200, and the evidence at hand indicates that the defalcation began about August, 1919.

President Gadsden said that after consulting with several members prominent in the association and near at hand he secured the arrest of Gibson, who is now out on $15,000 bail. Up to this time no evidence has been found that any one else is criminally involved in the case, and Mr. Burritt, the former secretary, has been actively assisting the auditors. The prosecution of Gibson is in the hands of Carl R. Miner, an attorney connected with Hodenpyl, Hardy & Company, and the evidence so far indicates that the defalcation is between $40,000 and $50,000. It is possible that some of this may be got back from the defaulter.

WORK OF THE ASSOCIATION WILL NOT SUFFER

Fortunately the finances of the association, according to President Gadsden, are such that it will not actually suffer so greatly from the defalcation as might be expected. The reason for this is partly because of the increase in dues adopted last year and partly because with the higher fares prevalent on most properties and with the dues based on a percentage of the receipts, the amounts received have considerably exceeded the expenses of the association. Economy will have to be used, but no assessment will be required, and it is possible that with economical operation the rate of dues may be reduced next year. Mr. Gadsden added that he considered before this disclosure that the railways had run through the gamut of adversities, but this trouble certainly capped the climax. Nevertheless, he thought that the members might feel that the motto of the Salvation Army applied to them, namely, that a railway man may be down but he is never out.

As regards the immediate future, the association with the cash on hand and receipts expected during the rest of the year will have resources of about $100,000, and expenses of about $77,000, leaving a balance of between $22,000 and $23,000. This does not include, however, any amount for the salary of a secretary who might be appointed. He did not believe that the work of the association would be embarrassed in any way provided the president should be authorized to borrow on notes a sum not to exceed $10,000. In regard to bonds, he explained that the bookkeeper was under a bond of $2,000 and the secretary under a bond of $20,000, but owing to some unexplained reason these policies had been allowed to lapse. The policy for $20,000, however, did not lapse until December of last year, and most of the defalcation had occurred before that date. Mr. Gadsden then said that in the emergency he had asked Mr. Welsh, at that time statistician of the association, to act as secretary pro tem. Mr. Welsh has performed the duties of this office in a very satisfactory way and the thanks of the association were due to him.

Appointment of Secretary Postponed Pending Report of Plan-and-Scope Committee

Taking up then the question of the appointment of a secretary, Mr. Gadsden said that seven or eight names of possible candidates had been presented by members, but said he himself had no one particularly to recommend. He felt that in any such selection the president of the association should not take a preponderating part, as the president is a temporary officer only, whereas the secretary, if he is the proper man, will guide the affairs of the association long after the president has retired to the ranks.

Committee on Plan and Scope of American Electric Railway Association Anncunced by President Gadsden April 19, 1921

President: P. H. GADSDEN.....Philadelphia

Past-President: JOHN H. PARDEE, New York

Vice-Presidents:

BRITTON I. BUDD..............Chicago
C. D. EMMONS..............Baltimore

Members of executive committee:

R. P. STEVENS..............New York
W. H. SAWYER..........East St. Louis

Membership at large:

JOHN G. BARRY...........Schenectady
H. V. BOZELL..............New York
H. G. BRADLEE.................Boston
HARLOW C. CLARK............Newark
B. C. COBB.................New York
MYLES B. LAMBERT.........Pittsburgh

Nevertheless, while he had no candidate for the position, Mr. Gadsden said that he had very positive views of the type of man who should be selected. In his opinion the time has come when the association should be set on a higher and broader plane of usefulness. Up to three or four years ago it was only a small organization with a budget of from $30,000 to $40,000. Everybody knew most everybody else, and the secretary's office was a sort of social headquarters for visiting railway men. This was all right so far as it went, but in the future the office should be a place where much more effective work should be done for the benefit of the industry. The future secretary should be a leader, a man with vision and personal force, some one to do the thinking for the industry as a whole.

The president said he thought the association could learn much from the practice of the National Electric Light Association and the American Gas Association, both of which were doing work largely along the lines which he had in mind. Then he asked whether it would not be wise to reorganize the association along such lines and then look around to see who would manage it.

In response to Mr. Gadsden's request for different members to express their opinion there were remarks from Messrs. McCarter, Budd, Bradlee, Curwen, Sawyer, Mortimer, Stanley, McGraw and Cobb, all of whom expressed themselves in agreement with the sentiments expressed.

The motion was then made and carried that the president should be authorized to appoint a committee of twelve to make a study of the needs and opportunities of the association, to take as long as was needed and to report its recommendations with suggestions as to the name or names of men qualified to carry out the work of directing the work of the association. It was decided also that this would include the future publication policy of the association as regards *Aera*. Mr. Gadsden then said that he was sure that the committee would welcome suggestions from the members of the association as to ways in which the work of the association could be improved or desirable changes in the plan and scope of the organization of the association. He said he would not announce the membership of the committee at that time, but did so on April 19. The names appear in the panel on this page. Mr. Gadsden then said that he had asked the auditor of the association, Mr. Boylan, to prepare a statement of the entire financial situation to be included in the minutes of the meeting.

Several resolutions were then adopted. One was that for the present checks should carry two names, that of the president and that of B. A. Hegeman, Jr. Another was that the president would be authorized to issue a note for $10,000 to care for any immediate liabilities of the association.

Convention in October, but Without Exhibits

John G. Barry, chairman of the committee on location for the next convention, was then called upon to present the report of that committee. Mr. Barry explained that the committee had canvassed the question of an exhibit at the next convention and had also conducted a poll of the manufacturer members of the association. The recommendation of the committee was that there should be no exhibit. The presentation of the report of Mr. Barry was followed by a general discussion as to the relative merits of different cities for the meeting. An early announcement will be made. It was decided that the convention would be held during the week beginning Oct. 2, and the president was authorized to confer with the committee on subjects to determine the length of the meeting, whether it should be four days as usual, or a shorter time because of the omission of exhibits.

Other Business Transacted

Mr. Stevens for the Transportation & Traffic Association then asked the association to appoint a committee to take up certain phases of the one-man car situation, particularly to decide whether it would be worth while to compile considerable data in regard to the use of one-man cars and if so how best to obtain it. The motion was passed.

The president then announced that Frank Hedley, president Interborough Rapid Transit Company, had resigned as a member of the executive committee of the association on account of lack of time to attend to the duties of that office. The resignation was accepted.

The president then gave some figures of the number of requests for information that were being received by the association from member companies to indicate that the number of requests was increasing, showing that the normal functions of the association were going on and that it was of increasing benefit to the members.

E. C. Faber, Chicago, and Labert St. Clair of the association office, then gave some particulars as to the work of the committee on publicity. They explained that it is hoped to make May 4 a "National Electric Railway Day." On this day electric railways would be encouraged to emphasize the progress which had been made in the electric railway art during the last forty years and the additional service which these companies were now rendering the public. The date, May 4, was selected because it was the anniversary of the completion of the Richmond road in 1888. Mr. St. Clair then explained that a pictorial history of the industry was being compiled showing the growth and enormous increase in the investment, and the obsolescence to which such apparatus was subject. Mr. St. Clair also presented examples of car cards and other advertising, as well as other work of the department.

A discussion then followed on various methods of publicity. Mr. Budd told about the work of the Illinois Committee on Public Utility Information and said that a number of utility officials in Illinois had volunteered to be prepared to make addresses on utility problems before Chambers of Commerce and other organizations when requested to do so. Other speakers on the subject included Mr. Faber, Mr. Storrs, General Harries, Mr. Wickwire and Mr. Lambert.

The concluding business of the association was a discussion as to whether municipal properties should be admitted as members of the association, but no final action was taken. The meeting then adjourned.

National Electric Railway Day

MAY 4 has been designated by the American Electric Railway Association as National Electric Railway Day for the purpose of calling public attention to the present highly effective transportation service that the electric railways now render as compared to the service a third of a century ago. Electric railways throughout the country are urged to give the lesson of improved service on that day by displaying early-day cars, particularly horse cars, and by drawing attention to the improvements over former-day service. The big lesson, of course, that can be drawn from the display is that although service has greatly improved fares have scarcely increased, if, indeed, they are not lower in many cities, with the diminished value of the dollar, than they were in the old horse-car days, when the short hauls were in vogue.

May 4 has been selected because it is an important day in electric railway development. Thirty-three years ago on that date the contract for the first successful overhead trolley line to be conducted on a large scale was completed in Richmond, Va. Thirty cars were put into service.

A suggested program for the day and mats of photographs of early cars have been prepared by the advertising section of the Division of Information and Service and are being sent to member companies. Among the plans suggested are to man the early car with a crew which has been long in the service, offer prizes to school children for essays on the history of the local transportation system and provide the trainmen with badges carrying the words "National Electric Railway Day," etc.

Distribution of F. E. R. C. Report

ACTING Secretary J. W. Welsh of the American Association has notified member companies that a limited supply of the complete proceedings of the Federal Electric Railways Commission report, bound in buckram, are available. As far as the supply will permit, the association will furnish without charge a complete set of the volumes to any city or college library, or to any city official designated by a member company. As the requests must come through the member companies and as the librarians may not know about the report, it devolves upon electric railway officials to take the initiative in seeing that their local college and public libraries are given an opportunity to secure these volumes.

Hoover Resigns as President of American Engineering Council

AT ITS meeting in Philadelphia on Saturday, April 16, American Engineering Council of the Federated American Engineering Societies accepted the resignation of Herbert Hoover as president. Mr. Hoover gave as his reasons for resigning the fact that the council was, by its constitution, necessarily engaged in furthering national activities which involve legislation and that he as a member of the executive branch of the Government could not consistently direct such activity as an officer of American Engineering Council. The council expressed regret at Mr. Hoover's retirement, and voted its appreciation of his leadership during the organization period of the council and his initiation of policies and effort.

The meeting of the council was one of the most important yet held. The committee on the elimination of waste in industry presented a preliminary report and indicated some of the benefits to be derived by American industry from the final report.

L. W. Wallace, executive secretary, reported on the employment service of the council and made recommendations for its broadening, which were adopted. He also explained the activity of the council with respect to licensing of engineers, which was in line with the policy previously announced and indicated in these columns. Other matters reported on were publicity, petitions of the council for appointment of an engineer as Assistant Secretary of War, not obtained, and an engineer to the Interstate Commerce Commission, still under consideration, and other relations to the executive branch of the Government.

The next meeting of the council will be held in St. Louis on June 3.

Trackless Trolley at Leeds

RECENT reports from Great Britain indicate that Leeds is preparing for trackless trolley service in one section by providing a bituminous concrete wearing surface over the present paving and tramway tracks, completely burying the latter. The Leeds Corporation Tramways is said also to have under construction a trackless vehicle of the double-deck type, to seat fifty persons.

According to present plans this vehicle will be provided with pneumatic tires.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Open Shop Likely

Present Controversy at Davenport Would Seem to Leave This as Only Course Open

The open shop looms up as a strong possibility in the industrial policy of the Tri-City Railway, Davenport, Ia., after June 1 as a result of two moves against the traction lines founded on a contract with the trainmen's union.

First came an injunction suit by the Socialist city attorney restraining the company from putting into effect a wage reduction from 70 to 40 cents an hour. The Socialists in the City Council had previously refused the company permission to install one-man cars and otherwise economize.

For this reason the company is bound under this injunction to keep a 70-cent scale until June 1 or to continue losing money and meet the exacting demands of a ruinous contract although the company states that this contract was negotiated on the understanding that wages could be reduced if the Council did not grant a fare sufficiently high.

Again, matters were complicated for the company with the public when a state board of arbitration found against the railway in a dispute over the discharge of a union official. The board found that the company erred in not submitting this dispute to arbitration in accordance with the terms of its contract with the trainmen.

EDITOR THINKS COMPANY ERRED

Last year a compulsory arbitration clause in the contract brought an increase in wages from 60 cents to 70 cents an hour. During times of rising wages the contract did not protect the company as it voluntarily raised the wage above the contract scale in order to secure an adequate supply of labor.

For these reasons there is a strong probability that when the unions refuse to accept the contract the company might feel justified in suggesting that employees will be hired and paid as the company shall see fit and not in accordance with the terms of any contract—in other words, the open shop.

The finding of the state board of arbitration against the Tri-City Railway growing out of the discharge of the union president by the company has provoked considerable discussion. An editorial writer in one of the local newspapers stated that in view of this decision of the board the company should reinstate the discharged union president. He stated that the discharge had been caused by a public address made by the union president and that employees' associations would employ business agents if their officers could not speak without fear of discharge.

While the board which considered the matter of the discharge found the company was in error in denying the arbitration of the controversy, it did not recommend the reinstatement of the discharged union official, stating this was not within its province.

Wage Reduction Accepted Willingly

A group of former employees of the Eastern Massachusetts Street Railway, some of whom have been out of work since that company ceased operation of its lines in Woburn, recently held a meeting in one of the carhouses and sent a letter to the trustees signifying their willingness to accept a reduced scale of wages if the trustees will resume operation in that district. A short while ago a similar communication was received from some of the men who worked on the Gloucester lines before that division suspended operations.

Cleveland Men Accept Wage Cut

MEMBERS of the union in Cleveland, at a referendum election on April 15, voted 2,158 to 348 in favor of a 20 per cent reduction in their wages effective May 1, when the present agreement with the Cleveland Railway expires. They ratified the wage cut rather than submit the matter to arbitration along with the proposition of permitting the open shop question to be an issue in arbitration proceedings.

Starting on May 1 trainmen in Cleveland will receive 55 cents an hour for the first three months of service; 58 cents for the next nine months and 60 cents an hour after the first year, instead of 70, 73 and 75 cents an hour, the rate which has been in effect. The company will still pay time and a half for Sunday and holiday overtime, but only time and a quarter for overtime on week days. Extra pay for spreads of more than fourteen hours on swing runs is abolished. There will be no eight-hour limit for runs on Sunday and holidays as in the past, nor will ten hours' pay be given for eight-hour runs on night cars.

Officials of the Cleveland Railway estimate that the wage reduction for trainmen will save the company close to $100,000 a month. There is little prospect, however, of a change in fare under service-at-cost in the near future, for on April 1 there was a deficit of $50,000 in the interest fund, which must be built up to $750,000 before there can be a reduction in fare.

Wage Cut in Detroit

Mr. Burdick Reiterates Determination of Company to Reconcile Pay with Changed Economic Conditions

That the wages of the platform employees of the Detroit (Mich.) United Railway are to be decreased from 20 per cent to 28 per cent effective on May 1 was announced in a letter under date of April 15, addressed by E. J. Burdick, assistant general manager of the company, to officials of Division 26 of the Amalgamated Association. The decrease will put the men on the pay basis which existed before the wage increase of last May. It is being made because the company can no longer support the present pay roll and render adequate service to the public.

The pay for all motormen and conductors in passenger and freight service except those employed on the Pontiac and Flint city lines will be as follows: for the first three months, 50 cents an hour; for the next nine months, 55 cents an hour; after twelve months in service 60 cents an hour. The rates for Pontiac and Flint city line employees will be 2 cents less an hour in each of the three classes.

In his letter Mr. Burdick calls attention to the fact that since Jan. 1, 1916, wages of the low rate men have been increased 180 per cent, of the middle rate men 143.33 per cent, while the wages of the high rate men have been increased 134.38 per cent during the same period. A table showing the fluctuations of living costs for the period included between Jan. 1, 1916, and April 9, 1921, is included in the letter.

The present rates of pay received by the three classes of men are 70 cents, 73 cents and 75 cents an hour.' The reductions to 50 cents, 55 cents, and 60 cents an hour will mean decreases of 28.57 per cent, 24.66 per cent and 20 per cent. The new rates will exceed the 1916 rates by 100 per cent in the case of the low rate men, 83.33 per cent for the middle rate men and 87.50 per cent for the high rate men.

A reduction in pay to all employees except motormen and conductors was made effective on Jan. 1, of this year. When the company proposed last December to decrease the wage rates of platform employees 20 per cent, the union officials questioned the company's right to open the wage question at that time. The men were willing to arbitrate the matter and an arbitrator was appointed by the company and one by the men. The two arbitrators were, however, unable to agree on a third arbitrator to complete the board.

No opinion has been expressed by the union officials as to whether or not the proposed wage cut will be accepted.

Utilities Commission Re-created

Kansas Industrial Court Overloaded and Another Body Is Created to Supervise Utilities

Governor Allen of Kansas, having found the Kansas Court of Industrial Relations too busy to handle the public utilities of the state in addition to the industrial question, addressed a special message to the Legislature on this point, and as a result that body has re-created a utilities commission to replace the one which had been abolished at the time of the creation of the Industrial Court and whose function had been assumed by the Industrial Court.

COMBINED HEARINGS PROVIDED

The new law provides, however, that cases involving question of wages, industrial conditions. or other industrial disputes, within the normal jurisdiction of the Court of Industrial Relations are to be heard as a combined case and determined at the same time by the Public Utilities Commission and the Court of Industrial Relations sitting as one body. The presiding judge of the Court of Industrial Relations is to preside at the hearing, and in the event of a tie vote the presiding judge of the Court of Industrial Relations is to cast the deciding vote.

National and local interest attached to the operations of the Kansas Court of Industrial Relations from the inception of that body. The fear that arose when it was proposed to re-establish the Utilities Commission that the advantageous feature would be lost of having one court look into both sides of a utility question, with regulatory power over labor as well as over capital, was overcome by placing a case which involved both labor and rates of fare before both commissions as a combined body. This fear, although pronounced, was shown by Governor Allen to be largely groundless, for in his message to the Legislature he pointed out that out of 650 public utility causes before the Industrial Court in the past year only three related directly to the subject of both rates and wages.

DUAL AUTHORITY CAUSED CRITICISM

In his argument for the re-establishment of the Public Utilities Commission Governor Allen pointed out that the unfortunate results of adding public utility administration to the work of the Court of Industrial Relations was to make up public utilities law paramount and the work of the Industrial Court incidental. Moreover, the Industrial Court had been unable to touch many duties of general industrial development. The Governor said:

> In addition to the criticism of the court, due to lack of time for proper industrial work, it has suffered constant misrepresentation out of the unavoidable confusing of its purposes with the purposes of the public utility work. During the year in which the old Public Utilities law had been administered by the Industrial Court, there has been 650 public utility cases. The court has deemed it wise in a great number of these cases to increase public utility rates.
>
> Notwithstanding the fact that none of the principles of the Industrial Court law were concerned in these public utility increases, every criticism that has come as the result of the increase in public utility rates has been placed, not upon the old Public Utilities law, but upon the new Industrial Court.
>
> Public utility regulation thus was dramatized as a new thing which had its origin in the Court of Industrial Relations. The fact was lost sight of that it was a work carried on since the establishment of the Board of Railroad Commissioners in 1883, and the Industrial Court became familiar to the public, not upon its merits, but upon the activities which attend its regulation of public utilities in a peculiarly trying period.
>
> Public utility administration, instead of becoming incidental to the Court of Industrial Relations, became distorted into the chief aim of the new court. The big, real purpose of the labor court was lost to public view. The real purpose and value of public utility regulations also became subjected to the unreasoning attack of those who as a result of labor politics was fighting the Industrial Court.

Judge Clyde M. Reed, one of the members of the Industrial Court, was made chairman of the new Public Utilities Commission. Further facts with relation to the personnel of the commissions will be given in a later issue.

God Bless Stone & Webster!

The Seattle *Daily Times* recently closed its contest and awarded prizes for the best solution of Seattle's municipal street railway problem, for which a prize of $200 was offered. In the final analysis, the *Times* was unable to decide upon a single plan. In consequence, two winners were picked by the judges, and the full sum of $200 was awarded to each.

The prize-winners were selected from the twelve contestants who had won prizes of $25 each in the weekly contest. The two prize-winning solutions were submitted by E. H. Severson and C. T. Conover. Mr. Conover said:

> There is only one thing to do—get down on our knees to the former owners of the street car lines, humbly and contritely beg their foregiveness, give assurance of a fair deal in future and make the best arrangement possible for a return of the lines. This would involve granting a fair equitable franchise and affording the company absolute security from persecution by the City Council. Perhaps nothing of this sort can be accomplished but it is the only hope.
>
> Stone & Webster came into this city and bought up a lot of disconnected lines, some of them in the hands of receivers. The money was supplied by several thousand middle class New England people—some by the estates of widows and orphans—all invested on Seattle's good faith and prospects. The company became the largest employer of labor in Seattle and, unt harassed by the City Council, gave us an admirable car service and made all reasonable extensions. It paid the largest burden of taxes of any corporation in Seattle and in addition paid a gross earnings tax; had to help build bridges, pave streets, etc.
>
> It became the sport of the City Council; it was baited and harassed and strangled until no further extensions were possible; the equipment fell off and dividends practically ceased. Then the city stepped into the pit it had dug, surrendered the vast revenue from taxes and undertook to operate by political means what had very nearly failed under efficient private management, besides paying for the system from the revenues.
>
> Every sane man knew it could not be done. There is only one solution: On what basis, if any, will Stone & Webster take the system back, assuming that they can be assured that the property will not again become the football of political opportunists?
>
> Meantime we must elect to the City Council men pledged to fight to the last ditch to prevent the $15,000,000 of utility bonds from becoming a general obligation and whose pledged word is known to be good. After that we shall have to "let nature take its course."

Purchase Negotiations Begun

Detroit United Railway Accepts Gracefully the Will of Voters and Helps City

Conferences are being held between the attorney for the Detroit United Railway and city officials with a view to starting negotiations for the city to take over eight day-to-day agreement lines of the railway as approved by the people at the recent election. According to Mr. Stevenson, counsel for the company, engineers for the company are now working on the cost figures of these eight lines. The figures will be taken from the company's books and will be based upon the cost of tracks and equipment.

PRICE MAY BE ARBITRATED

The day-to-day agreement lines were built by the company but the city reserved the right to take over the lines at cost less depreciation at such time as it was desired to operate them as part of a municipal system. It is the mutual belief of the company's attorney and the city officials that a board of arbitration will be resorted to to settle the price to be paid by the city.

While no definite views were expressed regarding the question of taking over the Fort Street and Woodward Avenue lines where franchises have expired, it was intimated by Mr. Stevenson that the company was willing to consider the views of the city at such time as the people decided that the city should take over these lines, with the idea of fully co-operating with the city in providing the needed service.

The Fort Street and Woodward Avenue lines, if joined with the lines the city is constructing and with those which it is planned to take over, will give the city two main lines to the heart of the city. The recent ruling of the Supreme Court upholding the legality of Mayor Couzens' municipal ownership system also held that the company's rights on Fort Street and Woodward Avenue having expired, these streets would have to be vacated any time the city desired. City officials believe that these lines will not be torn up but that they will be taken over instead in order that the people be subjected to as little inconvenience as possible. The voters may be called on to decide upon the purchase of the Fort Street and Woodward Avenue lines.

CROSSING QUESTION BEING ADJUSTED

The question of crossing of the company's tracks by city lines was also touched upon in the recent conference. Corporation Counsel Wilcox has filed a brief in the suit instituted by the city to determine judicially the city's right to make such crossings. A copy of the brief and blue prints of what the city considers the proper type of crossing have also been submitted to Mr. Stevenson. As soon as the company's engineers approve the blue prints, temporary crossings will be permitted until a type of crossing has been decided upon for permanent installation.

Agitation to Abolish Wisconsin Commission

Assemblyman Peterson of Milwaukee has announced that he will endeavor to have legislation enacted abolishing the present Railroad Commission. The idea is to substitute in its place a Public Service Commission with a membership of three, the personnel to be appointed by the Governor. It was Mr. Peterson who started the proceedings which resulted in the interpellation of the commission of Feb. 24 by Legislature regarding the commission's policy in dealing with public utilities.

An effort will also be made to have enacted an amendment to the public utility law which would require utility companies earning more than 8 per cent to place the excess in a sinking fund to be used to care for emergency conditions or for such other similar purposes as shall be determined from time to time by the proposed public service commission. The theory seems to be that the reserve fund would tide utilities over lean years and, perhaps, avoid increased rates. The measure will also provide that in fixing the value of a utility's property invested capital shall not be construed to include borrowed capital.

Whatever opposition exists to the present Railroad Commission will probably be mobilized in support of the Peterson legislation, but it is said to be doubtful whether this legislation will be enacted.

In connection with the attack upon the present commission, the Milwaukee Common Council has adopted a resolution instructing the City Attorney to draft legislation for introduction in the State Legislature abolishing all authority of the Railroad Commission over public utilities, vesting such authority in Common Council.

At the proceeding on Feb. 24, which revolved mainly around the Milwaukee Gas Light Company, Chairman Jackson of the Commission told the Legislature that the Milwaukee Gas Light Company, which had been recently granted a 20 per cent increase in rates, is earning only 3.7 per cent on its valuation as compared with 8 per cent considered reasonable by the commission. It was brought out that in the past ten years the Gas Company had declared dividends averaging 13.8 per cent and that in 1916 the dividend rate had been 23.7 per cent. Mr. Jackson pointed out, however, that the policy of Wisconsin regulation is to permit a fair return on the physical valuation basis and not to regulate dividends.

Trial Operation for Three Months

The railway system at Marietta, Ohio, has begun operations for a trial period of three months, during which time the officials of the company hope to demonstrate to residents of the community and city officials the exact financial status of the operation of cars in this city. One-man cars are being operated, with a 7-cent fare. Service is maintained over three separate routes, transfers being issued to other lines.

With the expiration of the company's franchise, a tentative agreement was reached between traction officials and members of the City Council whereby the present test of three months was started. During this time receipts and expenditures on the various city lines will be recorded in order to determine exactly the revenue derived from each. The Council is privileged to examine all books of the company during the trial period and to name an auditor to examine accounts. A detailed report showing the expenditures and receipts of each line will be filed with the Mayor within fifteen days after the expiration of each thirty-day period.

New York State Wages to Be Arbitrated

The employees of the New York State Railways in Rochester, Syracuse and Utica represented by their union officials and the officers of the company have signed an agreement providing for the arbitration of the differences caused by the proposal of the company to reduce the wages of the men 25 per cent. The action came as the finale of more than a week's negotiation.

As noted in the ELECTRIC RAILWAY JOURNAL several weeks ago the company submitted a revised agreement to become effective on May 1. In this proposal it said that it felt that the wages as fixed by the National War Labor Board for trainmen under date of July 31, 1918, would be fair to all parties interested under the contract. The company also outlined changes which were desired in working conditions. It explained at that time that the wages of the employees had been increased 126.41 per cent over those paid at the beginning of the war.

In accordance with the provision of the present contract calling for arbitration the company will appoint an arbitrator, the men will appoint an arbitrator and these two will appoint the third member.

Pending the decision of the arbitration board the working conditions of the 1920 contract are to remain in force, but the rate of wages in the company's contract submitted under date of March 29, 1921, are to become effective as of May 1, except that in no case will the differential be more than that of motormen and conductors on city lines. It has also been agreed that the question of wages to be paid men operating one-man cars will be determined by the arbitration board. The award is to be retroactive to May 1. Both sides agree to be bound by the findings.

Benjamin E. Tilton, vice-president and general manager of the New York State Railways, has been selected as the company's representative on the arbitration board. Mr. Tilton was the company's arbitrator in the settlement of the strike of last May.

Mr. Culkins Sees Municipal Ownership Ahead

That the final outcome of the railway tangle in Cincinnati, Ohio, might be municipal ownership of the local railways was intimated by William C. Culkins, Director of Street Railways, in a letter addressed to members of the Ohio Senate, condemning the Griswold bill limiting municipal indebtedness as it has been amended and now pending in the State Senate.

Mr. Culkins said in his letter that in behalf of the car-riding public he urged the Senators to use their best efforts to bring about the defeat of the measure in its present form, since it practically would nullify the constitutional privilege of owning public utilities other than water-works.

Part of the letter reads as follows:

> Although Cincinnati may never desire to exercise its purchase option, nevertheless it is within the range of possibilities that the present railway reorganization tangle can only be clarified by the city exercising its right to condemn and to buy the property.
>
> The passage of any legislation which would take away from the city the power to exercise its option would materially weaken its position in controlling the traction situation and would in my opinion represent a triumph of the traction lobby over the constitution of the State.

Mr. Culkins said that there was nothing new concerning a definite plan for scaling down of capital of the Cincinnati Traction Company, but from the tone of his letter to the State Senators it is believed by persons interested in the traction situation that the city wants to be in a position to carry out its rights and not be hampered or handicapped by such a measure as the amended Griswold bill.

Trackless Trolley Recommended

The General Electric Company has recommended that the trackless trolley system be considered in the disposition of the railway problem of Greenville, Tex., according to H. L. Andrews of the railway and traction division of the company, who has made a special report of the Greenville transportation problem.

A trolley car system for Greenville is estimated to cost a minimum of $251,600, which would provide five cars, the rebuilding of more than 9 miles of track and the construction of 2.72 miles of new track.

The estimated cost of the trackless trolley system with the same number of cars is given by Mr. Andrews as a minimum of $107,000 with the possible maximum of $109,300. The cost of installation of five storage-battery cars over the same mileage is given by L. Klopman, in a supplementary report, as $199,330.

Peoria Men to Ask Increase. — Motormen and conductors of the Peoria (Ill.) Railway are said to have prepared demands for presentation to the company calling for an increase in wages of 3 cents an hour. This would increase the maximum wage from 59 cents an hour to 62 cents.

Boston Elevated Trustees Report on Fares

Different Rates Refused for Competitive Parallel Routes—Trustees Hope to Reduce Basic Fare When Deficit Has Been Wiped Out

In a report just made to the Massachusetts Legislature the trustees of the Boston Elevated Railway not only reaffirm the prediction made in their last annual report that the deficit of last year will be wiped out by July 1, 1921, but further suggest the possibility of some slight reduction in the present 10-cent fare after that date.

THE present report was made as a result of a resolve of the Legislature requiring the trustees to report on the feasibility of instituting a 5-cent fare on the line from Fields Corner, in Dorchester, to the South Station, in Boston. This latter proposition, the trustees refuse to recommend, as the distance is too great, and what they consider more important, such a line would be in direct competition with the regular 10-cent lines.

The trustees reported that the introduction of a 10-cent fare under the requirement of the Public Control Act instructing the trustees to establish fares which would meet the cost of service, resulted in an increase of revenue which, with economies and new methods of operation, has since been sufficient to meet the cost of service. The installation of the 10-cent fare, however, was accompanied by a loss in traffic at first large, then gradually diminishing and not yet fully made good.

This loss was largely confined to two classes of travel, one within local limits in outlying communities and the other between the business center of Boston and localities in close proximity. The through traffic between this centre and localities at the greater distance was not seriously affected although there was some loss of riding among those living along the lines of steam railroads, especially near stations where the railroad fare was less than 10-cents.

Under the law the trustees had no power to make experiments that would jeopardize the total revenue necessary to maintain a self-supporting service. They could, however, make experiments that offered reasonable promise of restoration of lost traffic without material invasion of net revenue or without the imposition of any unjust burden upon the rest of the riding public.

The localities selected for experiment were those which seemed to offer short distance riding, without transfer, upon surface lines not connected with the rapid transit service. Eight lines of this kind have been established each with a 5-cent fare, restricted to certain hours and to days other than holidays and Sundays. Five of them proved failures and were discontinued, but three of them are still in operation.

The policy of the trustees is:

> To add a practically non-competitive new service, the net earnings from which are larger than the average earnings on all lines so as to increase net revenue and to enlarge the usefulness of the railway. To add a service which competes with the 10-cent lines and in so doing substantially lessen net revenue would be to impose an unwarranted burden upon the rest of the travelling public and to threaten a deficit to be assessed against the cities and towns.
>
> Any plan that would furnish this limited service to some communities and deny it to others which offer like conditions would be plainly unjustifiable.

NO DIFFERENTIAL ALLOWED

The investigation by the trustees of the demand for 5-cent fare to Field's Corner from the South Station disclosed facts that appear to prohibit such service. The distance covered by the proposed routes would be 3.6 miles in one case and 4.6 miles in the other. The distance covered by the line in South Boston is 2.8 miles, that in Charlestown 2.4 and that on Washington Street in Boston 1.9 miles. Whatever might be the receipts upon the proposed lines in so far as they represented restoration of lost traffic or new patronage, they would beyond question be too small to bring them within the rule which has been adopted in protection of net revenue. Vital factors in the situation therefore seem to forbid the establishment of these lines named.

Continuing, the report says:

> It does not follow, however, that the outlook for a limited cheap service in this district is hopeless. It lies rather in the direction of the experiment with another type of such service which, after a thorough investigation of conditions and upon a favorable report from General Manager Dana, has been introduced within a few days in Everett and Malden. This experiment is based upon the opportunity which physical transfer of passengers between surface cars and rapid transit trains at the Everett Terminal affords for an operating test of certain local lines in those cities under a low fare. The purpose is the restoration of local travel lost under the 10 cent fare with an increase in patronage that will mean more useful service upon lines where traffic is now light.

This experiment if successful the trustees say will have great significance in pointing a possible way to other restricted service in connection with the physical transfer now made, between surface cars and rapid transit trains. However—

> It is not to be understood that these experiments with limited service will be allowed to delay or interfere in any way with a future reduction in the 10 cent basic fare whenever conditions make it possible to bring it about. The general interest in that fare and paramount importance of the service under it constitute the reason for the restrictions upon all cheaper service which the trustees believe must be rigorously maintained.

No reduction can yet be made, the trustees say, in the 10-cent fare over lines which as a part of the entire system carry extraordinary cost of investment in subways, tunnels and elevated structures, and which rightly demand, as a fundamental need, speed, frequency of service and operation over long distances throughout the day and far into the night, on holidays and Sundays as well as on ordinary week days. Conditions now, however, seem to point toward the possibility of some reduction in that fare. The trustees in their last report predicted that the operating deficit outstanding on Dec. 31, 1920 would be absorbed before July 1, 1921.

The excess of receipts over expenditures for the first three months of this year has already reduced that deficit so that it is now practically assured that with the continued practice of justifiable economies the operating deficit of the earlier part of the year will have been made good, and the long outstanding deficit of $435,348.46 incurred in May and June of 1919 will have been eliminated. This result will make it possible for the trustees in their report of next July to outline the conditions under which and the extent to which some reduction in the 10-cent fare may be expected.

Phenomenal Record of Interurban Outlined

At the sitting of the Ontario Hydro-Radial Commission at Toronto during the week of April 11, Charles E. Thompson, assistant to the president of the Chicago, North Shore & Milwaukee Electric Railway, gave evidence. This is the commission that is considering the advisibility of building an electric railway from Toronto to Hamilton. Mr. Thompson went into the history of the road, its cost to construct and its cost to operate. He said that the labor bill now consumed 38.90 per cent of the total operating expenses. Wages for conductors and motormen ranged between 70 and 80 cents an hour. If the estimates of the Hydro Commission of Ontario at 55 cents an hour were applied to the North Shore railway the expenses of that company for labor would be reduced about $500,000 a year.

The witness told the commission that 1½ cents per mile was the lowest commutation rate the road could allow without piling up unprofitable business. In the early days, the roads offered specially low rates in order to attract business and as the years went by these rates became fixed in the public mind and it was very difficult to secure higher rates. He thought the roads should get higher rates for suburban service.

Power expenses now amounted to 49.80 per cent mainly through the increase in the price of coal, representing a 20 per cent advance. The operating ratio for the year was 76.83 per cent exclusive of taxes, and 80.41 per cent with taxes.

By liberal expenditure upon equipment the gross earnings of the road had been increased from $1,000,000 to $4,000,000 a year. This phenomenal increase had been secured in the face of competition with five other roads running from Chicago to Milwaukee. Passenger traffic had grown from 7,459,669 in 1916 to 13,288,186 in 1920, largely because adequate entrance had been secured to Chicago.

One-Man Car Invades Pennsylvania Avenue

Pennsylvania Avenue, Washington, D. C., is the latest railway thoroughfare to welcome one-man car operation. True, there is only one representative of this clan among the numerous green cars of the Capital Traction Company, which traverse this nationally important thoroughfare, but this one representative seems able to hold its own in the heavy traffic.

The car in question is not a standard safety car, but is one which was rebuilt in the shops of the Capital Traction Company from an old Stephenson single-truck longitudinal-seat car. This car was recently equipped for one-man car operation, and while the body, truck and electrical equipment are those of the old car it does have the complete safety device equipment of the standard safety car, furnished by the Westinghouse Electric and Manufacturing Company.

The mechanical details are unimportant, however, for the present purpose as the car was put on Pennsylvania Avenue, starting operation Sunday, April 10, for an experiment from the traffic standpoint. It operates on a route from the Georgetown carhouse to Seventeenth and Pennsylvania Avenue, Southeast, then returns to Twenty-sixth and G Street, Northwest, then returns to Seventeenth and Pennsylvania Avenue, Southeast, thence to Georgetown and repeat. This takes this car through the heaviest traffic of the day, when the regular double-truck cars are operating at scheduled speeds of 8.5 m.p.h. and on headways of fifteen seconds and sometimes less. This one-man car maintains its place in traffic with thorough satisfaction. It is attracting a good deal of attention on Pennsylvania Avenue for it is about the same size as the newly installed Sixteenth Street buses, which also operate for a short distance on Pennsylvania Avenue.

The Capital Traction Company is announcing no future plans with reference to one-man cars, either on Pennsylvania Avenue or elsewhere on the system, but has put this car in operation merely for experimental purposes.

Publicity Campaign for Schools and Libraries

The Indiana Public Utility Association is preparing special bulletins which will discuss the origin and growth of the public utilities in the State and their problems for distribution among the libraries and public high schools for reference work. The first bulletin, of a general character, will go into the public utility business from a broader standpoint, while the other bulletins, eight in all, will deal with the various utilities separately. For example, one will take up the interurban problem, one water, one gas, one telephone, etc. John Mellett, who is in charge of the work of the Indiana committee on Public Utility Information, sent out letters recently to 204 libraries and 128 high schools asking if they desired copies of the booklets. Within three days he had received eighty-six favorable answers from the libraries and fifty-eight from the high schools. Not one was unfavorable.

Construction Being Hastened

Municipal Road at Detroit Hopes to Complete 82 Miles of Line This Year

According to announcements by the city officials of Detroit, Mich., work will be pushed with a view to completing as soon as possible certain Municipal Railway lines to connect with the Detroit United Railway lines which the people voted to acquire from the company.

Proceedings leading to the taking over of the lines at issue will probably be started by a letter from the Street Railway Commission to the company to serve as official notice of the commission's intentions. The commission will probably ask the Detroit United Railway to name the price at which it will sell the railway lines the city proposes to buy. The value of the lines will probably be finally decided upon either by a board of arbitrators or by the courts.

Work has been started at several points on the new municipal lines as part of the program to build 82 miles of lines before the end of the present year. The municipal line on VanDyke between Charlevoix and Harper Avenues is expected to be in operation in about two months. It will be the third line put in operation, and will connect the St. Jean and Charlevoix lines now operating.

The sale of $2,000,000 of railway bonds has been authorized by the City Council, the proceeds to be used in financing the commission's construction program. They will mature in from twenty-seven to twenty-eight years. They are part of the $15,000,000 bond issue voted last year.

Suit for $100,000 damages has been brought against the city by John A. Mercier, the contractor who built some of the first sections of the municipal ownership line last year and whose contract for work on the uncompleted portion of the Charlevoix-Buchanan lines was canceled by the city. Mercier's previous suit to enjoin the commission from canceling his contract and proceeding with construction with its own forces was dismissed by Judge Hunt.

A. C. King has been appointed arbitrator for the city, and H. A. Crecelius, Chicago, has been appointed arbitrator for the Detroit United Railway in the matter of the crossing controversy resulting from the forced crossing of the company's Mack Avenue line by the St. Jean municipal line. No definite decision has so far been reached and the proposal has been made by Corporation Counsel Wilcox that the city be permitted to use the crossing temporarily, as it is now installed. If no agreement is reached the court will probably appoint a third arbitrator.

New Franchise to Be Negotiated in Vancouver

With the object of arriving at a fair and satisfactory agreement on the fare and franchise questions negotiations are to be commenced shortly between officials of the British Columbia Electric Railway, Vancouver, B. C., and representatives of the various municipalities on the mainland served by that system. Mayor Gale has announced that the city will be ready in a short time to enter into discussion of the proposed franchise requirements of the company. By agreement entered into with the city all negotiations on franchise and rate questions must be concluded before Aug. 1.

The company's future policy of extensions and improvements depends very largely upon the arrangements it is able to make in regard to franchise. The company has announced that it will be required to expend at least $1,000,000 before the end of 1922 on improvements to its Stave Lake plant to provide the power necessary to keep pace with the constantly growing demands of the city.

It is pointed out that if unreasonable regulations and starvation rates are exacted of the company by the city officials the problem of raising the necessary capital to make the required improvements will become increasingly difficult.

Italian Commission Will Arrive Soon

The Italian Commission on Railway Electrification, which expects to make an extended trip through the United States and Canada, visiting all heavy traction systems, will arrive from Europe on April 25 aboard the *Lorraine.* The commission is headed by Prof. Guido Semenza, consulting engineer, while the other members are Prof. Cian Giacomo Ponti, electrical engineer, Italian-American Electric Company; Marquis Ferdinando Cusani, manager, Italian-American Electric Company, and Curzio De Regibus, assistant chief engineer electric traction service of the Italian State Railways.

Besides all electric heavy traction installations the itinerary of the commission includes inspection of all urban rapid transit systems, the principal electric interurbans and many large electrical manufacturing plants. In addition such hydro-electric plants and high-tension transmission lines will be visited so that they may familiarize themselves with the most recent American practice regarding hydraulic power generation and transmission.

One of the main purposes of the delegation is to bring about better technical relations between Italy and the United States and a better reciprocal knowledge of the status of technology and electricity in both countries. This thorough investigation of the American transportation systems involving electric traction will probably keep the members of the commission in this country until Aug. 1.

Progress in Akron's Franchise Situation

The Merchants' Committee, chosen by the various civic organizations in Akron to assist in bringing about a satisfactory settlement of the street railway situation, is making progress toward ironing out the differences between the city and the Northern Ohio Traction & Light Company. The disagreement involves the sections of the franchise ordinance dealing with the method of valuation of the property and the rate of return to be allowed on that valuation.

The question of the valuation of the system seems in a fair way toward settlement. The city has secured the services of Hagenah & Erickson, the engineering firm that made an appraisal of the property for the city in 1918, while the company has secured the services of the firm headed by Dean M. S. Cooley of the University of Michigan, which it employed last year in making a valuation.

Hagenah & Erickson valued the city lines at $4,810,000 in 1918 while Dean Cooley placed a valuation of $7,200,000 on the lines last fall. It is expected the two firms will use their old valuations as a basis soon to reach an agreement. With the arrival at a valuation figure by these two firms the way will be opened for further negotiations when a settlement of the other points at issue will probably be reached without great delay.

Mayor Beck has announced that the Council will unquestionably pass any ordinance which has the approval of the civic organizations represented by the Merchants' Committee.

Taxpayers Still Attacking Purchase Deal

Attorneys for the Puget Sound Power & Light Company, Seattle, Wash., on April 11 filed an amended complaint in the United States court in an equity action against the fourteen taxpayers suing the city in the Superior Court. The equity action previously filed against the taxpayers, asking for a temporary injunction, was dismissed April 1 by Federal Judge Jeremiah Neterer, his order of dismissal, however, allowing an amended complaint.

The amended complaint alleges the taxpayers have combined and confederated together to induce and compel the city to default in and breach the contract between the city and the Stone & Webster interests, executed to provide for payment of interest and principal on the $15,000,000 bond issue by which the city bought the railway property of Stone & Webster for municipal operation.

It is alleged that action of the defendants in denying, and in continuing to deny, that the city is obligated to pay the interest and principal from the gross revenues of the railway, in case such gross revenues are not sufficient to also pay costs of operating the system and its maintenance, has impaired the value of the $15,000,000 bond issue by many thousands of dollars. The action asks for a temporary injunction preventing the taxpayers from continuing to make these alleged claims and assertions, and from making any attack on the special fund created by city ordinance for payment of interest and principal on the bonds.

News Notes

Arbitrator to Settle Wage Dispute.—The employees of the Scranton (Pa.) Railway are seeking increases ranging from 10 to 13 cents an hour. The company refused the demands and suggested that the men consider accepting a reduction in wages or submit all matters at issue to an arbitrator or board of arbitration.

Commission Bill Lost in Committee.—The Illinois House of Representatives has refused to take from the state public utilities committee the bill introduced by Representative Alpiner to abolish the Illinois Public Utilities Commission. It was a strict party vote, the Republicans supporting a motion to postpone action until April 21.

Chicago Men Want Contract Renewed Unchanged.—The trainmen's union of the Chicago Surface Lines voted unanimously on April 4 to notify the company that it desired a renewal of the present contract, without change, for another year. The agreement expires on June 1. Both parties to it are required to give at least thirty days' notice of any proposed change. The Surface Lines management has not yet indicated its position.

Municipal Ownership Proposed in Eureka.—The city of Eureka, Cal., wants to buy the street car system operated in Eureka by the Humboldt Transit Company and has asked the Railroad Commission of California to fix a value of the tracks, equipment of all kinds, franchises and lands owned by the company. The application asking the commission to determine the just compensation to be paid by the city was filed on April 12 by George W. Cousins, Mayor of Eureka.

Supervisory Jurisdiction Proposed.—A bill is pending in the Legislature of Pennsylvania which provides for the extension of the duties and scope of the Department of City Transit of Philadelphia to include a supervisory jurisdiction over street railways in addition to the authority the department now has over city-owned lines. The Council of Philadelphia has indorsed the measure, but the bill on April 15 was still in the municipal affairs committee of the Senate. Senator Vare is chairman of this committee. It is charged that he is holding up the legislation.

Commission Wants Its Powers Extended.—The creation of a Public Utilities Commission by converting the Florida Railroad Commission into such a body is recommended by the State Railroad Commission in its twenty-fourth annual report to the Governor. That body is preparing a bill for introduction in the Legislature at its April session to bring this about. The commission's plan for financing the new body includes the levying of a tax on the gross operating revenues of all electric railways, lighting plants, gas companies, water companies, etc.

Commission Lowers Wage.—The Kansas Public Utilities Commission recently decreed that the railroads cannot close small way stations, has set $40 a month as the proper wage for such station agents and has decided that such stations need not remain open throughout the day. The decision was the result of the roads' attempting to close a large number of small stations because the cost of operating them exceeded the revenue therefrom. The commission's ruling has broken a wage agreement with the Brotherhood of Railroad Telegraphers whereby the men were paid 53 cents an hour for an eight-hour day. It is expected that the union will appeal to the Industrial Court.

Program of Meeting

C. E. R. A. Summer Meeting

The Central Electric Railway Association has issued a bulletin describing the summer meeting and outing to take place on board the S.S. South American during a six-day cruise on the Great Lakes. As previously announced the boat will leave Chicago at 8:30 a.m. on June 26, arriving at Toledo on Tuesday morning. It will proceed from there to Detroit, and then on to Benton Harbor, returning to Chicago on Friday, July 1. Everyone is urged to take advantage of the entire cruise starting from Chicago; especially those living in that vicinity, for it will be convenient for them to take the boat there rather than to take a train to Toledo and embark from there. Tickets should be secured from John Benham, International Register Company, 15 South Throop Street, Chicago.

Tickets for trip on the steamship, including meals and berth and including Government war tax, are as follows:

Round trip ticket from Chicago to Toledo and return to Chicago, covering the entire cruise, $70 each.

Toledo to Benton Harbor including war tax, $35 each.

Toledo to Chicago including war tax, $37 each.

Children more than five and under twelve years of age and accompanied by their parents will be charged half the full fare. Children under five years of age will be carried free, but there will be a charge of 75 cents each for any meals served to them in the dining room.

Financial and Corporate

$130,120,197 Investment Increase

Despite This Figure, Reported in Illinois, Revenue for Paying Return Decreased in 1919 Over 1914

The accounting section of the Illinois Public Utilities Commission has recently made public the comparative consolidated statistics of the various public utilities of the State under pre-war and post-war conditions. This consolidated statement, including the telephone, electric railway, electric light, gas and water utilities, brings out some interesting things, when comparison is made between the statements for the two years under discussion.

All of the utilities with the exception of the interurban railroads show a decrease in the ratio of net operating income to the book value of the properties in 1919 as compared with 1914. The reason for this exceptional position of the interurban railways is due, according to the statement of the commission, to the fact that a number of these companies resorted to the courts and obtained injunctions against the enforcement of the law limiting passenger rates to 2 cents per mile. In the accompanying consolidated statement for all utilities it will be noted that the amount of revenue available for paying a return on the investment, actually decreased in 1919 as compared with 1914, although the amount of investment devoted to operations in 1919 was $130,120,197 larger than in 1914.

If the same rate of return had been earned on the book value of the property devoted to public service in 1919 that was earned on the book value of the property in 1914, namely, 4.77 per cent, a net operating income of $53,304,018 would have been required in 1919. This amount is $6,264,316 in excess of the $47,039,702 actually earned in 1919, and indicates that the public of Illinois has received annually the benefit of more than $6,000,000 resulting from a reduction of this amount since 1914 in the earnings of the utilities.

Whatever may be said as to inflated capitalization before the commission had jurisdiction over the securities, the $130,000,000 added to the investment from 1914 to 1919 represents actual expenditures in money under the commission's regulations. Such added investment is entitled to a fair return for its use in the public service. Assuming that this $130,000,000 should earn 6 per cent, the amount required to be earned on this added investment would be $7,800,000 per annum. Deducting this from the amount actually earned in 1919, $47,039,702, leaves applicable to the $987,382,451 book value of property in 1914 only $39,239,702 of net income. This is $7,902,855 less than the net income earned in 1914. It represents a reduction of profits to the utilities of 16.76 per cent and a corresponding saving to the public. If it be assumed that the actual new investment since 1914 should earn 7 per cent instead of 6 per cent as above, the reduction in profit of the utilities would be 19.1 per cent.

The comparative statistics for the electric railways are shown in the accompanying statement. They cover twenty-nine interurban companies, twenty-two city companies, and nine combined interurban and city lines.

CONSOLIDATED STATEMENT OF THE ILLINOIS ELECTRIC RAILWAY COMPANIES

	June 30, 1914	Dec. 31, 1919	Per Cent Increase
	Book Value		
Interurban lines	$84,057,041	$86,973,770	3.47
City lines	298,934,913	315,118,819	5.41
Interurban and city lines	50,615,298	52,072,805	2.88
	Operating Revenues		
Interurban lines	$6,540,372	$12,055,034	84.32
City lines	45,502,620	63,063,097	38.59
Interurban and city lines	4,941,557	6,302,485	27.54
	Operating Expenses		
Interurban lines	$4,330,407	$8,907,417	105.69
City lines	25,580,227	45,224,557	76.79
Interurban and city lines	3,339,073	4,919,779	47.34
	Net Operating Revenue		
Interurban lines	$2,209,965	$3,147,617	42.43
City lines	19,922,393	17,838,540	10.46
Interurban and city lines	1,602,484	1,382,706	13.71*
	Taxes		
Interurban lines	$254,309	$451,347	77.48
City lines	5,552,381	4,669,265	15.91*
Interurban and city lines	137,511	188,834	37.32
	Net Operating Income		
Interurban lines	$1,955,656	$2,696,270	38.37
City lines	14,370,012	13,169,275	8.36*
Interurban and city lines	1,464,973	1,193,872	18.51*
	Ratio Net Operating Income to Book Value		
Interurban lines	2.33 per cent	3.10 per cent	.77
City lines	4.81 per cent	4.18 per cent	.63*
Interurban and city lines	2.89 per cent	2.29 per cent	.60*

* Decrease

CONSOLIDATED STATEMENT ALL ILLINOIS UTILITIES

Item	1914	1919	Per Cent Increase
Total book value	$987,382,451	$1,117,484,648	13.18
Operating revenues	154,579,081	234,860,653	51.94
Operating expenses	95,870,774	172,253,049	79.67
Net operating revenue	$58,708,307	$62,607,604	6.64
Taxes	11,194,611	14,956,307	33.60
Uncollectible accounts	371,139	611,595	64.79
Net operating income	$47,142,557	$47,039,702	.22*
Ratio of net operating income to book value of property	4.77 per cent	4.21 per cent	.56*

* Indicates decrease.

Denver Bondholders Are Organizing

Holders of the first and refunding sinking fund mortgage twenty-five-year 5 per cent gold bonds of the Denver (Col.) City Tramway are being solicited to deposit the bonds with a committee of which B. W. Jones, 16 Wall Street, New York City, is secretary. The court recently authorized the receiver to collect an 8-cent fare for adults, with two tickets for 15 cents, but the city and county of Denver are vigorously opposing even this temporary relief, and, in spite of the fare advance the current earnings, according to the committee of security holders, continue to be unfavorable.

On Nov. 1, 1920, the company defaulted the interest on $9,888,950 of bonds of the above-mentioned issue, and also on $484,500 Denver & Northwestern Railway first and collateral mortgage bonds. It had previously defaulted the interest on $2,498,000 of 7 per cent collateral trust gold notes. On Dec. 24, 1920, a receiver of the property of the company was appointed in the United States District Court for the District of Colorado, upon a creditor's bill.

The company has also defaulted a second installment of interest due on April 1, 1921, on the 7 per cent collateral trust gold notes, and it cannot yet be determined whether the company will be able to take up the defaulted Nov. 1 coupons on the first and refunding sinking fund mortgage twenty-five-year 5 per cent gold bonds before May 1, 1921, and it may be compelled to default the coupons due on that date. The committee now seeking deposits says that in the event of default on May 1 remedies under the mortgage would be available against the company.

A protective agreement has been prepared, under which the bondholers are requested to deposit their bonds. Copies of the agreement may be obtained from the Bankers' Trust Company, New York, or from the International Trust Company, Denver, Col., or from the industrial Trust Company, Providence, R. I.

New York Utility Legislation Completed

Prospective Earning Capacity at Contract Rate of Fare Made an Element of Value Under Governor's Urging

Governor Miller's special message to the New York Legislature, on April 13, resulted in the final passage of an amendment to the General Public Service Commissions law, which will make mandatory instead of permissive the things the commission shall do and consider in a hearing for increased fares, and which adds a clause that the Transit Commission shall also consider "the estimated prospective earning capacity of such property at the rate of fare at the time fixed and existent"—that is, the prospective earning capacity of each property at the rate of fare contracted for by the company and city.

As WAS reported in the issue of the ELECTRIC RAILWAY JOURNAL for April 16, page 748, the Governor included arguments to support the consideration of prospective earning power under a franchise or contract rate as being one element to consider in the work of making a valuation.

The Governor's special message, which outlined some of these arguments, follows in full:

> The ordinary standards of physical valuation, either original or reproduction cost less depreciation, do not meet the emergency with which we have to deal, and physical valuations according to any standard that could be prescribed will in most cases under existing conditions be grossly unfair to the public.
>
> It is claimed that many surface lines in New York City cannot be operated at a profit at any reasonable or practical fare, and it will doubtless be necessary to discard some lines and operate others even at a loss to provide the public the necessary service. Any plan or any rate based on the physical valuation of such lines would manifestly be unjust to the public.
>
> ### INFLATED VALUES GUARDED AGAINST
>
> Moreover, the rate of fare fixed by franchise or contract is a proper, if not an essential, element to be taken into account in the valuation of the property affected. Companies which have agreed to operate at a 5-cent fare or have accepted franchises with conditions annexed imposing a 5-cent fare, and the investors in the securities of such companies have no just claim to a valuation of their properties without regard to the average earnings which they may reasonably be expected to make in the future at such fare under the conditions which are likely to obtain. Indeed, the true rule of valuation of any property for business purposes is the capitalized value of its prospective earnings under normal conditions. Where such earnings in the case of a public utility are limited by contract or franchise they should be computed and the property affected by them valued according to such limitation. Any other basis of valuation of the traction lines in the City of New York might result in enormous gratuities to the companies at the public expense.
>
> We are dealing with a problem vitally affecting the public welfare, and for that reason alone the exercise of its police power by the state is justified. It is not a question of the rights of the companies, which are fixed by contract or franchise. The problem is to determine what is in the ultimate public interest, how credit can be provided to finance necessary extensions, and to obtain the additional facilities required to render adequate public service, and in the solution of that problem private interests must not be permitted to capitalize the public need.
>
> It is very difficult to prescribe by statute a standard or principle or valuation that will be fair and not too inflexible. I fear that in the absence of any other prescribed standard the statute as it now stands will be construed as contemplating a valuation based on physical values, which, as I have said, may prove to be grossly unfair to the public.
>
> A standard has been proposed which appears to me to be fair and sufficiently flexible to enable the commission to do exact justice while at the same time it safeguards the public interests. That is the standard which has to be employed da in the conduct of business affairs; namely, the prospective earnings of the business to be valued. Applied to the matter in hand the valuation should be based on the estimated prospective earnings at the fare in each case which the company is permitted to charge under its franchise or contract with the city, the valuation in no case to exceed the original cost or the fair reproduction cost less depreciation of the property necessarily employed in the public service.
>
> ### INCREASED FARES OFTEN REDUCE REVENUE
>
> The fare which any company can charge will, as a practical matter, be limited by what other companies are permitted to charge, and the amount which it is reasonable for the public to pay is also a limiting factor, and it has been found that increased fares often result in a reduction of revenue. Of course, the statute should be flexible enough to permit consideration of all relevant facts and circumstances, such as, for example, the prospect of increased earnings of lines now serving undeveloped territory.
>
> The foregoing principle of valuation will, in my opinion, be fair to the public and to the companies alike, and, with the limitation that the valuation cannot in any case exceed the original cost or the fair reproduction cost less depreciation, it will adequately safeguard the public interest. Of course I construe fair reproduction cost to mean such cost under normal, not abnormal, conditions.
>
> There are other verbal changes needed to limit the discretion of the commission and to define more accurately the jurisdiction of the Transit Commission.

The Governor issued a subsequent message to the press, expanding his ideas as to what he meant by the principle of valuing the properties on the basis of prospective earnings. In this statement he said:

> The principle that I suggest is that the properties shall be valued on the basis of their earnings. Necessarily these must be prospective earnings, because that is the way you value all property under average conditions, conditions that are liable to obtain in the future, at the fare they have agreed to take.
>
> ### A CONTRACT IS A CONTRACT
>
> Here is the proposition. These contracts were made, and I think a contract is a contract. Now it is claimed that emergency conditions have existed under which an unusual situation is presented. Undoubtedly there is an emergency existing in transit in the City of New York at the present time. Nobody doubts that. Now, some just basis or principle of valuation must be hit upon if some comprehensive scheme is worked out. My principle is that these properties shall be valued at what they will earn at the stipulated fare under conditions that are likely to obtain, not under abnormal conditions.

Asked if a change in the fare for one company in New York City meant that all the railway companies would have to have the same fare, the Governor said:

> It would ordinarily appear that if a company had a fare different from that at which another company could carry passengers between the same points it would not get any passengers if its fare was less advantageous to those who travel. If the surface lines had a higher fare than the elevated or subways everybody would ride on the elevated or subway. We are going to have a commission to work that out.

In response to the Governor's urging the Legislature passed amendments to the Public Service Commission law so that the Transit Commission in New York City shall have jurisdiction and supervision over all railroads, street railroads and stage or omnibus lines or routes, and to persons or corporations owning, leasing or operating such lines which lie wholly or in part within the corporate limits of New York City. The general State Commission, however, shall have jurisdiction over construction, maintenance, terminal facilities, stations, etc., outside of New York City.

There is thus created a sort of joint jurisdiction over lines operating across the city lines. The Transit Commission also has jurisdiction over all holding corporations or persons which hold the majority of the stock of a corporation subject to the jurisdiction of the Transit Commission in respect of the relations between such corporation and the holding company or person.

The most important changes in the law, however, are that the Transit Commission is given power to regulate construction, maintenance, stationary equipment, terminal facilities, stations and local transportation facilities of street railroads, or stage or omnibus lines or routes within the City of New York, as well as to regulate operation and fares, and the provision which makes mandatory instead of permissive the things the commission shall do and consider in the hearing for increased fares, and that

> The commission shall, with due regard among other things to the estimated prospective earning capacity of such property at the rate of fare at the time fixed and existent, and to a reasonable average return upon the value of the property actually used in the public service, and to the necessity of making reservation out of the income for surplus and contingencies, determine the just and reasonable rates, fares and charges to be thereafter observed and inforced as the maximum to be charged for the service to be performed, notwithstanding that a higher or lower rate, fare or charge has been heretofore prescribed by general or special statutes, contract, grant, franchise condition, consent or other agreements,

and finally, in connection with the valuation of the property to be made,

> Such valuation shall be made with due regard to the estimated prospective earning capacity of the property necessarily used in the public service at the rate or rates of fare of the company prior to the taking effect of this act was entitled to charge, in view of the provisions of the contract or franchise under which the property is operated or held, or of any lawful order in force, fixing or regulating rates or fares and of the competition of other lines and with due regard to all other pertinent facts and conditions; but such valuation shall not in any case exceed the fair reconstruction cost of the property less depreciation. Such valuation shall be in such detail and shall include such elements of cost or values and shall be made in such manner as the commission may prescribe. Such valuation as finally determined by the commission shall be the basis for all allowances to the railroad companies under the plan and for thereafter fixing the returns on the property so valued, anything in this chapter to the contrary notwithstanding.

One other modification of interest is that in the plan of readjustment which the Transit Commission shall make, of the four purposes which were originally included, the following is now eliminated:

> The readjustment of the existing rights and obligations of the railroad companies so that the real values in the railroads may be protected and securities stabilized.

Poor Showing Up State

New York State Railways and Schenectady Railway Fail to Earn Sufficient to Pay a Return

For the year 1920 the New York State Railways reports earnings of but $1.75 per share of stock outstanding as against $1.43 the previous year. On Aug. 1 a service-at-cost contract became effective with the city of Rochester for a term of ten years. This contract provides for an annual return, ranging from 6 to 8 per cent upon the base value of the property used in serving the Rochester city lines, tentatively appraised at $17,500,000.

In Schenectady net income decreased 28.2 per cent, leaving but $32,851 with which to pay dividends on $4,100,000 of outstanding stock. The accompanying table shows the results of operation for the last two years for both the New York State Railways and the Schenectady Railway.

INCOME ACCOUNT — NEW YORK STATE RAILWAYS AND SCHENECTADY RAILWAY

	New York State Railways			Schenectady Railway		
Item	1920	1919	Per Cent Change	1920	1919	Per Cent Change
Railway operating revenues	$10,454,410	$9,406,473	11.1	$1,905,313	$1,664,282	14.5
Operating expenses (a)	8,369,558	7,134,491	17.3	1,629,966	1,380,325	18.1
Net revenue railway operations	$2,084,852	$2,271 982	—8.3	$275,346	$283,957	—3.0
Net revenue auxiliary operations	2,631	562	567.5	....	....	.....
Net operating revenue	$2,087,483	$2,271,420	—8.1	$275,346	$283,957	—3.0
Taxes	621,173	602,869	3.0	94,072	90,683	3.7
Operating income	$1,466,310	$1,668,550	-12.1	$181,274	$193,274	—6.2
Non-operating income	300,041	37,473	700.3	1,512	3,913	—61.4
Gross income	$1,766,351	$1,706,023	3.5	$182,786	$197,187	—7.3
Deductions	1,336,671	1,361,816	—1.8	149,935	151,484	—1.0
Net income	$429,680	$344,207	24.8	$32,851	$45,703	—28.2
Sinking fund appropriations	32,633	31,641	3.1	....	....	.....
Surplus	$397,047	$312,566	27.0	....	....	.....
Undivided earnings of other companies	21,075	27,699	—23.8	....	....	.....
Total for dividends	$418,122	$340,265	22.8	$32,851	$45,703	—28.2

( ) Including depreciation and deferred maintenance accrual.

Memphis Doing Better Than Was Anticipated

Commissioner Horace Johnson has pointed out that while the deficit reported by the receivers of the Memphis (Tenn.) Street Railway for the month of February is several thousand dollars in excess of the January deficit, it is $15,290 below the deficit in the estimate prepared by Ross Harris, consulting expert, covering each month for the year 1921. The January deficit was $4,941 below the estimate of Mr. Harris.

Figuring on the basis of operations for previous years and using the other data at his command, Mr. Harris prepared a table for each month of 1921 in which he set out his estimates of items of expense included in cost of service. The report also gives the estimated revenue for each month, the number of revenue passengers and the number of car-miles. By means of his estimates of the total cost of service and the total revenue for each month he arrives at the estimated deficit or surplus for that month. Thus far the company has exceeded Mr. Harris' expectations.

In January, for instance, the estimated deficit was $15,364, while the actual deficit was $10,423. In February, instead of the deficit of $32,560 anticipated by Mr. Harris, the actual deficit for the month was $17,290. Mr. Harris anticipates a surplus for April amounting to $3,350 and for May amounting to $9,147. Deficits of $146 and $1,483 respectively are anticipated for June and July. The figures in Mr. Harris' table would result in the estimated deficits and surpluses for the individual months cancelling each other by the end of the year, thus leaving untouched, however, the deficit of $129,564 with which the receivers entered upon the year 1921.

The deficit at present is in the neighborhood of $157,000. This includes the total deficit of more than $129,500 for the year 1920, together with the January deficit of more than $10,000 and that of February in excess of $17,000. In the event the operations during March, April and May do not come up to expectations and the deficit continues to grow instead of taking a downward trend, the receivers may seek an 8-cent fare.

City Urges Consolidation

The brief filed by Corporation Counsel Geraghty of Spokane, Wash., with the State Public Service Commission in the action of the city to prevent the granting of the 8-cent fare to the Washington Water Power and the Spokane & Eastern Railway & Power Company, says:

> These conditions compel us to the inevitable conclusion that the only solution for the situation, so far as the Spokane & Eastern company lines are concerned, lies in consolidation.
>
> There is no question of confiscation involved here, because this is not a case where the city or the state has attempted by legislation to fix a rate of fare to be charged by the Traction company. It is a case where the company and the city made a contract which at this time has proved unprofitable to one of the parties. Courts and commissions do not, as a matter of law, relieve competent contracting parties from improvident contracts.
>
> Some fanciful difficulties in the way of a consolidation were suggested by the representatives of the two companies at the hearing, but we have no hesitation in saying that if the companies desire in good faith to consolidate the lines no legal impediment will be found growing out of the city's laws. The responsibility for the failure to effect a consolidation must rest upon the companies themselves.

Toledo Traffic Decreases

The net result of March operations of the Community Traction Company, at Toledo, Ohio, under the service-at-cost ordinance, shows a deficit of $73,756, according to the April 11 report made by Commissioner Wilfred E. Cann.

While net earnings from operation show a surplus of $18,854, as compared with $9,998 for February, the daily revenue due to the poor industrial conditions is less by $470 and operating expenses are also $280 less. Fixed charges increased to $92,610 through the raising of the amount paid into the depreciation and maintenance funds and the establishment of an injuries and damages fund.

There is a balance in all of these funds at the end of March of $37,362, which may be deducted from the net deficit in order to compare with the previous month.

The stabilizing fund is now at a level of $313,333, it having developed that only payments for interest on bonds and dividends on preferred stock may be drawn from that fund when revenues do not equal expenses and fixed charges.

Mr. Cann believes that with the elimination of the bus competition on April 21, the rerouting of the Huron-Erie line, the adjustment of wages and new speed schedules savings will accrue which will wipe out the deficit before a fare raise is necessary.

A tentative agreement has been reached with the interurban lines whereby they are to pay a rental of 40 cents a carmile for the use of the city tracks, the overhead and power. This is a 41 per cent increase over what they are now paying on a percentage of gross receipts basis. Under the new contracts revenues, it is estimated, will be increased about $80,000 a year.

During the month 5,710,010 revenue passengers were carried at a deficit of 1.29 cents each. Car-mile operating expenses totaled 41.56 cents against 42.86 during February. Revenue from operation was 42.4 as against 46.5 cents per car mile the previous month. Total for the month was 8.64, compared to 8.98 in the month of February, showing a decrease in traffic of 3.94 per cent.

$400,000 Shrinkage in Louisville in Amount Available for Dividends

The accompanying income statement taken from the annual report of the Louisville (Ky.) Railway shows operations for the year ended Dec. 31, 1920. As operations during the preceding year were much affected by a strike of trainmen, comparative income figures are also shown for 1918, as well as 1919, to give a means of judging the condition of the company as compared with a year more nearly normal than was 1919.

The report also contains a historical sketch of developments leading up to the recent increase in fare from 5 cents to 7 cents as well as the valuation of the property by J. G. White Company details of which have already been printed in these columns from time to time.

INCOME STATEMENT—LOUISVILLE RAILWAY

	1920	1919	1918
Revenue from transportation	$3,962,206	$3,371,567	$3,556,031
Other operating revenues	184,301	165,667	151,658
Total operating revenues	$4,146,507	$3,537,234	$3,707,689
Operating expenses	3,229,187	2,794,439	2,383,972
Net revenue from operations	$917,320	$742,795	$1,323,717
Taxes	366,000	366,000	355,369
Operating income	$551,320	$376,795	$968,348
Non-operating income—			
Lou. & Int. R.R. net income	124,256	$100,000	$84,657
Other non-operating income	2,675	5,297	3,758
Total non-operating income	$126,931	$105,297	$88,415
Gross income	$678,251	$482,092	$1,056,763
Deductions from gross income—			
Interest on bonds and notes	$632,790	$630,920	$627,000
Amortization of discount on notes	9,207	8,677	5,055
Total deductions	$641,998	$639,597	$632,055
Balance available for dividends on stock	$36,253	*$157,505	$424,708

*Deficit.

Knoxville Valuation Figures Expected Soon

A decision of the Tennessee Public Utilities Commission relative to the appraised value of the property of the Knoxville Railway & Light Company is expected within the next few days.

The appraisal made by Albert S. Richey, representative of the commission, and J. H. Perkins, representative of the company, was submitted to the commission for its consideration on Dec. 19, 1920. A combination of circumstances has caused a delay in the final outcome. The election came on in Tennessee. The Legislature met and has just adjourned. These took the time of the members and then Mr. Campbell took his seat on the board after the first hearing on the subject of the appraisal and he desired to go over the records thoroughly before casting his vote.

After the commission has made its decision on the value of the property of the traction company, together with its commercial lighting plant, another decision will follow as to whether the company is entitled to a 7-cent fare and 2 cents additional for transfers for which it has petitioned.

The two engineers who signed the report found that the historical value of the plant was $6,234,141 and that the reproduction cost would be $10,362,964. William H. Weiss, the engineer representing the city of Knoxville, refused to sign the majority report, but made a separate report, finding, in his opinion, that the appraisal of the other two engineers was approximately $2,000,000 too high.

Financial News Notes

St. Petersburg Road Doing Well.—The St. Petersburg (Fla) Municipal Railway showed a profit of $10,000 for the month of March, according to Director of Public Utilities R. E. Ludwig. He states the lines will more than earn interest and sinking fund charges this year after taking care of operating expenses and many additions and improvements—including several new one-man cars which have been bought.

Too Soon to Draw Conclusions.—J. P. Barnes, president of the Louisville (Ky.) Railway, is disappointed but not discouraged over the results with the 7-cent fare put into effect there recently. The new fare has hardly been in force long enough to justify the drawing of a general conclusion, but the expected increase of 20 per cent in revenue under the new rate has proved actually to be not more than 10 per cent.

Guaranteed Dividend Being Paid.—Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., on April 14 authorized the following statement: "The dividend due on April 1 to holders of Manhattan Railway stock under the terms of the lease to the Interborough Rapid Transit Company, will be paid in groups, commencing April 15, and payments will continue in accordance with the financial ability of the company. It is anticipated that the entire dividend will be paid within the present month."

Trenton Road Valued at $5,000,000.—The value of the property and business in the service of the public of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been determined by Ford, Bacon & Davis, engineers, New York, as being $5,000.000. The methods pursued in the valuation were the same as used in the Public Service Railway valuation. The reproduction cost new of the property as a going concern based on Sept. 1, 1920, prices for labor and material is estimated to be $9,391,228. The historical cost built up from the companies, records show a value of $5,335,674.

Foreclosure Sale Set for April 30.—Paul E. Thomas, special master, will offer for sale at Meadville, Pa., on April 30 $300,000 of capital stock of the Meadville, Conneaut Lake & Linesville Street Railway $350,000 capital stock of the Crawford & Erie Railroad, and $145,000 of capital stock of the Peoples Incandescent Light Company, all pledged under the indenture securing the first 5 per cent bonds of the Northwestern Pennsylvania Railway, Meadville, Pa., dated 1911. The securities are to be sold under foreclosure proceedings with a view to consummating the reorganization plans for the properties outlined some time ago.

Assets $1,139,884 Less than Claims.—Robert W. Perkins, receiver of the Shore Line Electric Railway, Norwich, Conn., has filed with the clerk of the Superior Court his appraisal of the property as of Feb. 1, 1921, and a report of operations for fifteen months of the receivership. Portions of the road have been sold and dismantled. The appraisal of road and equipment is $2,451,965. The receiver's report shows that on the entire system there was an operating deficit of $52,227 for fifteen months up to Dec. 31, 1920, to which January of this year added an operating deficit of $3,749 and February of $6,112, making a total to March 1 of $62,089. The difference between tangible assets and preferred claims is $1,139,884.

Distribution Provided in Reorganization.—The Western Pacific Railroad on April 11 was authorized by the California Railroad Commission to issue and sell at 85 and accrued interest $4,180,000 of its first mortgage 5 per cent bonds. The bonds will be acquired by the Western Pacific Railroad Corporation and then distributed to bondholders of Sacramento Northern Railroad who have agreed to sell their bonds to the Western Pacific. The Western Pacific has offered to pay $27.50 a share for the first preferred stock, $15 a share for the second preferred and $6 a share for the common. It has also offered to exchange for the bonds of the Sacramento Northern first mortgage bonds of the Western Pacific on the basis of $80 face value of the Western Pacific bonds for $100 face value of Sacramento Northern bonds.

Traffic and Transportation

Six Cents in Indianapolis

Basic Five-Cent Fare Preserved Under Ticket Ruling—One Cent for Transfer

A cash fare of 6 cents, twenty tickets for $1 and 1 cent for a transfer were authorized by the Public Service Commission of Indiana on April 15 in passing on the petition of the Indianapolis Street Railway for higher fare and more revenue. Under the order those who buy tickets will pay the same fare as they have been paying recently. The 1-cent charge for a transfer was continued by the commission's denying the company's petition for a 2-cent transfer charge. The company's request for a 6-cent cash fare and twenty tickets for $1 is granted. The commission feels that under the order 5 cents is preserved as the basic fare. The order took effect at 12.01 o'clock a.m. on April 18.

John W. McCardle, a member of the commission, dissented in a brief statement as follows:

> I must dissent from the relief granted for the reason that I do not believe it will provide the revenue that is necessary.

Commissioners Lewis, Van Auken, Barnard and Johnson concurred in the order.

The order is temporary. It says:

> That the commission continue consideration of the prayer of petitioner for an extra 1-cent transfer charge, pending a period of thirty days, in which there shall be determined the effect, in percentages, of patrons paying cash fares and traveling on tickets, of the fares hereinbefore authorized, but the commission reserves the right to pass on the matter of the prayer for an additional charge of 1 cent for transfers at any time if it should be conclusively shown that the percentage of patrons paying cash fares is so small as to nullify the relief which the commission herein seeks to provide.

The order also directs that within the next month

> The Indianapolis Street Railway and the interurban railroads, which are parties to this order, bring before the commission for final conclusion all matters pertaining to the carrying out of plans filed with the commission in conformity with its order of Dec. 18, 1920, for the remedying of inadequacy of interurban freight terminals in the city of Indianapolis, to the end that said matters may be brought to an early conclusion.

The local company, which has provided freight terminal facilities, recently made an agreement with the interurban companies by which the latter are to take over and develop the Kentucky Avenue freight terminal site. The agreement, before becoming effective, must be approved by the Public Service Commission, and this matter is to come before the commission soon.

Ferdinand Winter, attorney for the company, declared recently in a reply brief filed with the commission:

> The railway does not claim that there is anything in any order of the commission that obligates the commission to provide rates of fare that will enable it to pay dividends upon its preferred stock. It does claim, however, that the public has no right to the use of its property except by the payment of rates which will afford a reasonable return upon the value of such property, and that, as the commercial rate of interest ranges from 7 to 8 per cent such reasonable return should be at least 7 per cent, after payment of all operating expenses, including the sum set apart by the commission for maintenance and repairs and all taxes.

The brief continued by pointing out that the company understood the commission had set 7 per cent as a fair return, but that the company was asking for much less than this amount.. It pointed out that the value of the property as fixed by the State tax board was $16,500,000 and that the value of the property as tentatively fixed by the commission, including recent improvements and additions, was approximately $16,000,000. It also showed that 7 per cent of this sum was $1,120,000 and that the proposed net earnings of the company would be only $891,237. This would be further reduced by $52,796, representing the difference between an overestimate of estimates of receipts from cash fares and an underestimate of expected receipts from transfers.

Eight-Cent Fare in Syracuse

The New York State Railways, is authorized to charge an 8-cent cash fare, with four tickets for 29 cents, on its Syracuse lines under a decision handed down by the Public Service Commission for the Second District of New York on April 19. The new rate is authorized to go into effect on three days' notice.

Determination of the commission was announced following a long executive session in which a report of Commissioner Joseph A. Kellogg, who heard the case, was discussed at length.

The company asked for a 10-cent fare. It has been charging 6 cents.

Opposing the application, Corporation Counsel E. H. Lewis argued that a 7-cent fare, with four tickets for 25 cents, would be adequate.

The increased fare is granted for a period of six months and will continue thereafter until a further order of the commission.

The valuation fixed by the commission on the property was $8,922,728. The company claimed a valuation of $21,500,000. The city put in figures, prepared by Milo R. Maltbie, expert, showing a valuation of $5,121,453.

The Mayor's commission, which recommended a service at cost agreement, placed the valuation at $12,415,000.

The fare for children may be increased from 3 to 4 cents, the commission decided.

No other changes in the charter, newspaper rate, or other rules and regulations is permitted under the order.

Preferential Fares Raised

I. C. C. Over-rules Intrastate Franchise Fare on Ohio Lines of Wheeling Traction Company

Certain intrastate fares of the Wheeling (W. Va.) Traction Company were found to be preferential to intrastate passengers while prejudicial to interstate passengers in a decision handed down by the Interstate Commerce Commission in the case of Beall vs. Wheeling Traction Company. Discriminations arose because interstate passenger fares were higher than the fares between points within the State of Ohio. The intrastate fares in certain Ohio cities where the road operates were inadequate and could not be raised because of franchise requirements.

There were two complaints brought by citizens of Wheeling and Wellsburg, W. Va., the circumstances of which were so nearly identical that they were consolidated and disposed of in one report by the commission. To cite one case will be sufficient.

Wheeling, W. Va., and Bridgeport, Ohio, on opposite sides of the Ohio River, are connected by bridges. The distance from Wheeling to Bridgeport, Ohio, is 1.5 miles, to Martin's Ferry, Ohio, 5.72 miles, and to Bellaire, Ohio, 8.16 miles. The intrastate fare between Martin's Ferry and Bellaire, a distance of 8.94 miles, is 5 cents. The interstate fares from Wheeling to Bellaire, 8.16 miles, and from Wheeling to Martin's Ferry, 5.72 miles, at the date of hearing were each 10 cents. Subsequently they were increased to a cash fare of 12 cents and a ticket fare of 10 cents between Martin's Ferry and Wheeling and a cash fare of 16 cents and a ticket fare of 13⅓ cents between Bellaire and Wheeling. The transportation conditions under which the three movements are made are similar. The entire intrastate journey is made upon cars operated in interstate commerce since no through cars are operated between Bellaire and Martin's Ferry and intrastate passengers are required to transfer at Bridgeport from and to cars operated in interstate commerce.

Under the terms of the franchise granted it by the city of Martin's Ferry, the traction company may not charge more than 5 cents between Martin's Ferry and Bellaire, a distance of 8.94 miles. The Public Utilities Commission of Ohio permits the company to charge 10 cents between Bellaire and Bridgeport, a distance of 5.7 miles, the passenger in the latter journey traveling over the same rails in the same car as the Bellaire-Martin's Ferry passenger. A passenger boarding a car at Bellaire who states his destination as Martin's Ferry pays but 5 cents and is given a transfer to be used at Bridgeport. One who states his destination as Bridgeport, 3 miles less distant than to Martin's Ferry and over the same rails, must pay 10 cents. The practical result is that the traction company cannot make use of the authority granted it by the Public Utilities Commission of Ohio to charge 10 cents from Bellaire to Bridgeport because passengers to the latter point invariably escape the higher fare by stating their destination as Martin's Ferry. The same situation prevails with respect to travel from Martin's Ferry to Bellaire.

The commission regarded the interstate fares as reasonable and the intrastate fare of 5 cents between Martin's Ferry and Bellaire unduly low and ordered the Wheeling Traction Company to "desist from practicing the undue prejudice, preference and advantage and unjust discrimination." For this intrastate line the commission set the rate of fare at 16 cents cash or 13⅓ cents when tickets are purchased.

John E. Benton, General Solicitor for the National Association of Railway & Utility Commissioners, announced on April 14 that the association looked upon the decision at Wheeling as assumption by the Interstate Commerce Commission of jurisdiction enabling it to prescribe intrastate rates for the purpose of increasing the revenues of city railways. He said the decision would be contested. Mr. Benton is quoted as follows:

> The possible far reaching effect of the decision in offering opportunity to street railway carriers of that charter to secure revision of rates now limited by franchises, even though their lines be wholly intrastate, is evident.
>
> The possible consequences of this decision, if adhered to, and sustained by the courts, are obvious even without suggestion. Inasmuch as every street railway that connects with another which is interstate can easily become an interstate carrier, it may be said to rest with such carriers, of the class described in this case, to bring themselves under the jurisdiction of the Federal commission whenever they desire to do so.
>
> If the order of the commission in the Wheeling Traction Company case stands, it is evident that as to a large part of existing street railway lines, final power of rate regulation has passed from the states to the Federal commission.
>
> If the commission has jurisdiction to declare intrastate interurban fares discriminatory on the ground that it injures an interstate carrier to lose money—and hence interstate commerce—it would seem certain that it hurts just as much to lose it in the city as in the country.
>
> If may be regarded as certain that street railroads which come within the rule as finally laid down will speedily create situations which will call for the extension to their full limits of the principles involved in the decisions made accordingly, if the Wheeling decision stands, busy days would seem to be ahead for the Federal commission.

Jitney Ordinance Upheld

A court order of April 12 at Davenport, Ia., continued in force a temporary injunction under which operation of jitney buses on the public streets is prohibited. The court held that a "jitney bus is an automobile competing with a street railway company for business on the public streets." The jitney men's attorneys sought to prove that their clients were not jitney bus drivers but taxi cab proprietors and as such had the same right as any taxi-cab to operation on the streets. This decision forces the bus men to take out bonds and in other ways conform to the jitney bus ordinance now on the city's books.

Iowa Rate Cases Decided

U. S. Supreme Court Declares Confiscatory Rate in Ordinance Cannot Be Enforced

When the Supreme Court of the United States handed down its opinion on April 11 on the rate case of the San Antonio Public Service Company it rendered also an opinion in three cases of lighting rates in Iowa. The San Antonio decision, as abstracted in this paper for last week, upheld the position of the railway because the court held that the city did not have power to establish a rate of 5 cents. The Iowa cases were decided in favor of the utilities upon very similar grounds. In passing upon them the court said that the statute forbade the cities from making contracts regarding rates.

The cases were Southern Iowa Electric Company vs. City of Chariton; Iowa Electric Company vs. City of Fairfield, and Muscatine Lighting Company vs. City of Muscatine.

In its decision in the lighting rate cases the Supreme Court says:

> Two proposition are indisputable: (a) That although the governmental agencies having authority to deal with the subject may fix and enforce reasonable rates to be paid public utility corporations for the services by them rendered, that power does not include the right to fix rates that are so low as to be confiscatory of the property of such companies. . . . and (b) that where, however, the public service corporations and the governmental agencies dealing with them have power to contract as to rates and exert that power by fixing by contract rates to govern during a particular time the enforcement of such rates is controlled by the obligation resulting from the contract, and therefore the question of whether such rates are confiscatory becomes immaterial.

In the three cases in question the court held that a contract did not exist in the case of the Iowa cities, and it quoted comments on this subject by the Supreme Court of Iowa. A portion of this quotation follows:

> There was a time in the history of our legislation when the right of contract as to rates was conferred by statute upon the city councils. . . . By the revision and codification of 1897 the right of contract as to rates for utilities of this character was entirely eliminated, and the legislative power to regulate rates was conferred upon the city council in all cases. The reason for the change of method is obvious enough. Under the contract method the rights of the public were often bartered away, either ignorantly or corruptly, and utility corporations became empowered through the contractural obligations to enforce extortionate rates. The net result of the progressive legislation is found in our present section 725 whereby it is forbidden to any existing city council to bind the city to any rate for any future time. The power of regulating the rate is always in the present city council. It must be said, therefore, that the rates fixed by section 6 of the ordinance hereinbefore referred to were not fixed by contract.

In another case the Supreme Court of Iowa says, in referring to section 725 of the Code of 1897:

> That statute in positive terms forbids any abridgement of the right to regulate and fix charges of service corporations named in the statute, either by ordinance, resolution or contract. No one would now contend, in the teeth of the statute prohibition, that there can be a valid contract fixing permanent rates. As to corporations named in that statute, we have held repeatedly that there can be no contracting that rates fixed for service cannot be changed.

In commenting on this situation the Supreme Court of the United States says:

> The total want of power of the municipalities herein questioned to contract for rates which are thus established and the state public policy upon which the prohibtion against the existence of such authority rests, absolutely excludes the existence of the right to enforce, as the result of the obligation of a contract, the concededly confiscatory rates which are involved, and therefore conclusively demonstrate the error committed below in enforcing such rates upon the theory of the existence of a contract.

Spokane Fare Case Concluded

The Washington State Public Service Commission has heard the applications of the Washington Water Power Company and the Spokane Traction Company for permission to increase fares in Spokane from 6 cents to 8 cents. Statistics and estimates submitted by the companies included:

> Washington Water Power Company—Earnings for 1920, $1,082,760. Estimated earnings for 1921 (with 8-cent fare), $1,364,480. Increase, $281,720. Annual depreciation or replacement reserve, $174,600. Appraisal of property and working capital, $4,966,687. Eight-cent fare will yield 8.5 per cent. Present 6-cent fare yield, 2.82 per cent.
>
> Traction Company—Appraisal, property and working capital, $2,059,569. Eight-cent fare will earn (estimated), $606,177. Net income for the company (estimated), $60,863. Yield, 3 per cent.

Outstanding features of the hearing, in nutshell form, were:

Attorney Post for Washington Water Power Company requested that permission be granted to amend its complaint and ask for a 10-cent fare in the event that the city releases jitneys.

The city revived its suggestion for a merger of the two railway systems as the only solution of the fare problem.

The Public Service Commission engineer estimated a loss of 5 per cent in travel if the 8-cent fare is adopted. The Washington Water Power Company placed its estimate of loss in travel at 8 per cent. The commission's engineer valued the lines of water power company at $400,000 more than was claimed by the company.

If an 8-cent fare is granted the Washington Water Power Company will add $26,000 a year to the payroll of its trainmen by shortening the working day. It will also increase its charge for power for the railway from $90,000 to $180,000 a year.

Strike Emergency Over, Jitneys Must Go

Supreme Court Justice Hinman at Albany N. Y., on April 15 granted a request made by Harry B. Weatherwax, as a citizen and resident, that Mayor Watt clear the streets of the motor buses and jitneys which have carried the bulk of traffic in Albany and its suburbs since the trainmen of the United Traction Company struck on Jan. 29. The Court issued a writ of mandamus to compel the Mayor, through the police, to enforce the provisions of the transportation corporation law, which prohibits a bus line from operating without its owner first obtaining a permit from the city and a certificate of necessity from the Public Service Commission. Mr. Weatherwax is vice president and general manager of the United Traction Company.

Injunction Prevents Fare Increase in Cincinnati

The possibility of another "half-cent" increase in fare by the Cincinnati (Ohio) Traction Company on May 1 was defeated temporarily during the week ended April 16, when Judge Stanley Struble granted an injunction enjoining the company from taking such action. In the suit filed by City Solicitor Saul Zielonka and William J. Kuertz, assistant city solicitor, it was said that the company had reported a deficit in its operations for February and March. William C. Culkins, Street Railway Director, investigated the reported deficit and found that there was no real deficit, but that the methods which the company employed in keeping its books were responsible for the unfavorable report for February and March. A similar injunction was issued by Judge Stanley Matthews two months ago, after a suit had been filed by the city solicitor setting forth the same claims. It was only a temporary injunction as was the one issued last week.

Zoning Plan Continued in Westchester

An order holding that it is "unreasonable" to require the Westchester Electric Railroad, the New York, Westchester & Connecticut Traction Company and the Yonkers Railroad to transport passengers between points in different municipalities for a single 5-cent fare was issued on April 8 by the Public Service Commission, Second District.

The order permits the three lines to continue to collect fares on the basis of the present zoning system for the transportation of all passengers in Westchester County.

Franchise fare restrictions were waived in April, 1919, for two years and these waivers are about to expire. They permitted collection of fares by zones, generally each municipality constituting a zone.

The order of April 8 continuing the zoning system was granted on the application of the operating companies.

Re-Routing Considered in Milwaukee

Plans for re-routing a number of the city lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., passing through the down-town district of Milwaukee were discussed at a hearing held by the Wisconsin Railroad Commission in Milwaukee on March 22. At the conclusion of the hearing, the company was given until April 1 to analyze the different re-routing schemes suggested and to formulate a plan of its own. The commission will hold another hearing about April 15.

The hearing was held as a result of a recent decision of the commission ordering the joint use of tracks on Wells Street by the Milwaukee Northern Railway, the Chicago, North Shore & Milwaukee and the Milwaukee Electric Railway & Light Company.

Ten-Cent Case Presented

Hearing Well Under Way on Appeal of Public Service Railway for Increased Rate

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., said on April 11 that his company had no objection to the valuation by Ford, Bacon & Davis, just made public, being included in the pending fare case although the officers of the company felt that the figures of increased expenditure by the company were sufficient in themselves to justify the 10-cent fare. The hearing on the appeal of the company for increased rate had then been under way for about a week. Mr. McCarter also agreed to a further suspension of the proposed 10-cent rate until July 15.

For the commission, Mr. Osborne, who sat in place of President Treacy, said that the commission felt it was only fair to all parties concerned to express its views now in order that the least time possible might be lost. If the valuation was to be considered at all—now or at a later date—it might better be included in the present proceedings and the whole thing disposed of for all time. The commission wanted to settle the matter. If the question of valuation was to come up later, the time taken in the present proceeding was being wasted.

At a previous session of the present hearing Mr. McCarter startled his auditors by saying that the company had not come before the board before for relief because the commission did not want the company to ask for higher fares. He was referring to the commission which the present board has succeeded. He is reported to have said:

> We heard that the board did not want to hear any more applications for increases in 1920. However, we made the application in December because we decided we needed the higher fare, whether or not the board wanted to pass on the matter.

Mr. McCarter regarded it as an amazing spectacle to see Mr. Record, counsel for the municipalities which are opposing the increased fare, criticizing him for not asking for an increased rate.

Another witness for the company has been Richard E. Danforth, vice-president in charge of the railway. The tenor of his argument was that the 10-cent fare was reasonable and all that the traffic would bear. It took no greater proportion of the worker's income now than a 5-cent fare took in 1916. Mr. Danforth admitted that the public used jitneys because they liked automobiles, desired speed and disliked the railway corporation. He was unwilling to admit, however, that the growth of the jitney business was a consequence of the failure of the railway adequately to meet transportation needs.

The hearing will be resumed on April 22 with the presentation of testimony in the interests of the municipalities.

Eight Cents in Poughkeepsie

The Public Service Commission for the Second District, has granted permission to the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., to charge an 8-cent fare. Commissioner Kellogg, in a memorandum accompanying the order, said:

> It would seem that in a city located as is Poughkeepsie, where walking is under ordinary conditions permissible an increase in fare of such a substantial nature, especially one that arouses the antagonism of the people, would result in a very substantial falling off in the number of passengers carried. It is not probable that the slight increase authorized will diminish the fare paying passengers to any appreciable extent.

Mr. Kellogg said further that the company had never made a fair return on its investment. In the event that downward prices would affect and reduce operating expenses it is hoped that the company will promptly reduce the fare to a proper level. The old fare was 7 cents. When the company petitioned for a 10-cent fare the public protested against the proposed increase by organizing walking clubs with the slogan "We Walk."

Bamberger Electric Petition Denied

The Public Utilities Commission of Utah has refused to grant increases in passenger fares asked for by the Bamberger Electric Railroad, except that 1,000-mile mileage books may be increased from 2 to 2¼ cents a mile, and that the increase of one-tenth of a cent may be permitted to students' rates.

The rate on the 500-mile book remains at 2 cents a mile. Unlike the 1,000-mile book, the 500-mile book is not interchangeable with other lines. The new student rate is 1.1 cent a mile, but observance of the 5-cent minimum is required in all cases where the per mile fare amounts to less than 5 cents.

The 2¼-cent rate will not materially increase the revenue of the Bamberger line, the commission notes, but will materially simplify auditing as between the company and connecting lines, and for that reason this request was granted.

The company had asked for increases all along the line in its passenger fares, as well as certain increases in its freight tariffs. The latter were disposed of Dec. 31 last, when certain increases were permitted.

On the policy under which increases may be allowed, the commission makes this comment:

> The commission is of the opinion that the assumption is fundamentally wrong that the assumption that this petitioner should be granted the same scale of passenger fares in effect on connecting electric lines, in order to establish and maintain a parity of rates, in that it leaves out of consideration the important element of the cost of service. This petitioner's line connects the two largest cities of the state and traverses a territory with relatively dense population. Moreover, there is considerable interline traffic, and this petitioner, being the middle, or connecting link in the chain of electric roads that reaches from Payson, Utah, to Preston, Idaho, tapping and serving the rich central valleys of Utah, necessarily profits by its advantageous location, because the other lines act as feeders and supply it with

both freight and passenger traffic. The volume of traffic is, therefore, much heavier than is enjoyed by either of the connecting lines.

The above comment explains the commission's attitude that the mere fact that other electric railroads in Utah have been permitted increased passenger rates does not of itself justify the granting of an increase to the Bamberger Electric.

Jitneys Under State Control in Connecticut

Jitney control in Connecticut is now in the hands of the Public Utilities Commission. Although the new jitney regulation bill became effective on April 15 when the signature of Governor Everett J. Lake was affixed, there is a provision which states that no certificate shall be valid until ninety days after the act becomes a law. This will be July 15. It will then be mandatory for all persons or corporations operating automobiles as jitneys to apply to the Public Utilities Commission for a certificate and satisfy the requirements of the law.

Jitneys are defined in the bill as any autos carrying passengers for hire, operating over regular routes or in any manner resembling the service rendered by electric railways. Rules governing fees, routes and continuity of service that apply to all common carriers must be observed by the jitneys.

Applicants for certificates must first show the public necessity for such service over the route proposed, must outline the route in detail and state the character of service proposed. It is provided that hearings by the Public Utilities Commission will be held in the town where the applicant resides or proposes to render service and states that the mayor, selectmen or chief officials of such a town shall be notified to attend the hearing.

To Connecticut's motor vehicle commissioner will fall the duty of licensing and registering drivers of jitneys. Violation of any of the terms of the act will be punishable by a fine of not more than $100 or a jail sentence of not more than sixty days, or both.

Power to make future rules and regulations regarding the operation of jitneys within the State is vested in the Public Utilities Commission.

Wants Higher Fare.—J. J. Coleman, general manager of the Scranton (Pa.) Railway, recently appeared before the City Council at the request of the latter to explain why much-needed improvements to the system have not been made. Mr. Coleman pleaded for a higher fare claiming that extensive improvements could not be undertaken without money and the issuing of securities appeared out of the question. Last year the railway lost $47,340. By figuring in the company's estimated maintenance expense of $200,000 for this year the total expenditures, including the improvements, would run to $650,122.

New Orleans Railway Cites San Antonio Case

Judge Rufus E. Foster, of the Federal District Court at New Orleans, La., upon whose decision Receiver O'Keefe, of the New Orleans Railway & Light Company, was to accept or reject the ordinance adopted by the Commission Council on April 11 cutting fare from 8 cents to 7½ cents, has rejected the action of the Commission Council and has refused to approve the reduction.

Under instructions from Judge Foster, Receiver O'Keefe applied to the court for an injunction. The case was set for hearing on April 18. The proposed fare reduction was to have become effective on April 22.

The receiver alleged in his petition, which followed his refusal to accept the new rate of fare named in the ordinance, that the fare of 8 cents fixed by the Commission Council was confiscatory since it enabled the company to collect only 2 per cent per annum on the property, said by him to be worth $29,000,000, and that the Federal Court alone could determine whether or not an 8-cent fare was required to operate the railway system.

In asking permission of the Federal Court to reject the requirements of the ordinance reducing the fare from 8 cents to 7½ cents the receiver referred to the recent decision of the U. S. Supreme Court in the San Antonio suit, wherein the city was enjoined from enforcing a 5-cent fare with universal transfers. Following the lead of the company at San Antonio Receiver O'Keefe alleged that the 5-cent fare established on the New Orleans lines was a regulatory rate and not contractual.

Youngstown Jitneys Curbed

Jitneys at Youngstown, Ohio, are to be regulated. This is made so by a decision of the Court of Appeals for the Seventh Judicial District of Ohio that a regulatory ordinance passed Feb. 25, 1920, is constitutional, excepting for a few minor requirements.

The city was enjoined from enforcing the ordinance soon after its enactment, a group of jitney drivers attacking provisions requiring bonds, license fees, citizenship of drivers and the like. Their contentions were upheld in part by the Court of Common Pleas and the case was taken to the Court of Appeals. The decision of that body has now permitted the city to enforce the regulatory ordinance.

The ordinance requires that all operators of jitneys be American citizens, that each owner must provide a $5,000 bond for liability for personal injuries and a like bond for damage to property; that each owner must pay an annual license fee of $10 and each driver a license fee of $5. Each bus must be lighted in the interior and none is to carry passengers on the running boards or more than two in excess of the seating capacity. All owners or drivers must be more than twenty-one years old. Penalties for violation are a fine of not more than $100 or six months imprisonment for each offense. In the discretion of the court, any license may be forfeited upon a third offense.

The ordinance originally provided that every owner or driver must have been a resident of the city for at least six months; that every bus must give at least sixteen hours' continuous service and that it must operate over designated routes only. These provisions were declared unreasonable and invalid by the Court of Appeals.

Dallas Asked to Play Fair

The application of the Dallas (Tex.) Railway for authority to increase fares in Dallas from 6 cents to 7 cents is still under investigation by the City Commission. The company at first sought a straight service-at-cost franchise with a sliding scale and guarantee of 7 per cent on the agreed investment. This was refused by the City Commission. The company then applied for authority to increase fares to 7 cents, under the plea that the 6-cent fare now being charged is inadequate. Hearings were begun on Feb. 3 before the City Commission on the application.

At a recent hearing before the City Commission, Jack Beall, chief counsel for the company, made a plea for an immediate decision on the application, declaring that if the city declined to grant the increase, only one course lay open to the company—to go into the Federal Court and seek relief there on the ground that the present fares are unreasonable and confiscatory.

At the conclusion of a hearing at which J. F. Strickland, president of the company, was present, Mr. Strickland told the commission that, while he regarded the 7-cent fare as absolutely necessary to the continued successful operation of the lines, the company would accept a fare of four tickets for 25 cents, with a fare of 7 cents if paid in cash. This advance, he estimated, would mean an increase of between 4 and 5 per cent in the gross receipts of the company.

C. W. Hobson of the Southwest General Electric Company, who, with Mr. Strickland, was granted the franchise in 1917, was also a witness before the commission in the fare investigation. Mr. Hobson declared that the Dallas Railway had paid no dividend on its stock under the present franchise. Mr. Hobson said that he and Mr. Strickland were granted the franchise about the time the United States declared war and were reluctant to accept, knowing the inevitable consequence of the war. He said that they took the full ninety days allowed by the Board of Commissioners to accept, and did so then only in the hope of solving the railway problem for Dallas. Mr. Hobson said that every commitment made by the company when the franchise was accepted has been or will be carried out before May 1.

Transportation News Notes

Car Cards Quote This Paper.—A poster now being displayed in the cars of the Virginia Railway & Power Company of Norfolk reads: "The City Council of Kansas City, Mo., passed an ordinance on March 21 prohibiting jitneys from operating on streets where electric railways now operate. The Mayor signed the order on March 22. New routes must now be assigned away from car lines. — ELECTRIC RAILWAY JOURNAL."

Ten-Cent Fare in Ossining.—An order has just been issued by the Public Service Commission for the Second District of New York permitting the Hudson River & Eastern Traction Company operating in Ossining to advance its fare from 8 cents to 10 cents because the commission finds the road "performs more nearly the services of an elevator." The longest line is not more than 2 miles. The grades are very steep.

Chicago Fares Before Supreme Court.—The fight of the city of Chicago against increased fares of the Chicago Surface Lines was carried to the United States Supreme Court on April 13 when the appeal from the decision of the Illinois Supreme Court was filed in Washington. This is the case involving the jurisdiction of the Public Service Commission of Illinois, which on Aug. 6, 1919, allowed an increase in rates from 5 cents to 7 cents. Later the fare was increased to 8 cents.

Fares Come Down in Quincy.—An announcement made in Quincy, Mass., on April 14 by the home rule committee of the Eastern Massachusetts Street Railway stated that a reduction of the fares there will go into effect within a short time. This decision came as the result of a conference held a few days ago with the trustees of the railway. The committee announced that the recommendation of the home rule committee of Quincy that the number of rides per dollar be increased from thirteen to fifteen had been accepted, as it was stated the financial condition of the Quincy division warranted such reduction.

Skip-Stop System Defended—In reply to an attack by a Milwaukee women's organization on the skip-stop system of operation in the city, E. J. Steinberg, resident engineer of the Wisconsin Railroad Commission in Milwaukee, is reported to have stated: "The commission holds that where streets are less than 440 ft. apart, every other stop can reasonably be eliminated. The majority of streets in Milwaukee are less than 440 ft. apart. There are 175 streets in the city less than 340 ft. apart; more than 200 are 380 ft. apart; 75 are 510 ft. apart, and 95 are 660 ft. apart. These constitute the greatest number of car line crossings in the city."

Nine Cents in St. Joseph.—The Public Service Commission of Missouri on April 9 denied the application of the St. Joseph Railway, Light, Heat & Power Company for a straight 10-cent fare. The commission permitted the company to charge a cash fare of 9 cents, or a ticket fare of three for 25 cents, for adult passengers, and 4 cents for children. The increase became effective on April 20. It was in connection with the controversy over fares in St. Joseph that the Federal court at Kansas City, Mo., last November ruled that wrong methods had been used by the commission in valuing the company's property. The court considered the present fair value as the correct value for rate making.

Injunction Prevents Fare Action by Commission.—Fred E. Allen and W. H. Sawyer, receivers for the Alton Granite and St. Louis Traction Company, Alton, Ill., on April 2 obtained from Judge English of the U. S. District Court an injunction restraining the Illinois Utilities Commission from interfering with a proposed increase in street car fares in Alton. A case known as the 10-cent carfare case now before the commission cannot be decided until Judge English dissolves the injunction, which the city of Alton will make every effort to have dissolved. The present fare is 8 cents cash, with 7 tickets for 50 cents. The higher fare for the Alton street car system will probably be 10 cents cash with a ticket rate of eleven or twelve for a dollar. The company, tired of waiting for a decision on its 10-cent fare case, acted to hasten the fare increase.

Special Depot Car in Terre Haute.—A novel addition has been started to the street car service of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind. A special car is now run between the union depot and the Deming Hotel only. This car operates without schedule, the plan being to make immediate service available at the station upon the arrival of any train. If one of the regular cars operating on this line is at hand to take care of the travelers this special car waits until another train arrives, unless it should happen that a second car is necessary to accommodate all incoming people. In addition to making immediate car service available for all persons arriving in the city this special car will also augment the service from the downtown district to the station. The idea of installing this character of service is one of a number of good suggestions in developing new business on the depot lines, made in a paper by W. McK. White, presented before the Illinois Electric Railway Association and appearing in the issue of the ELECTRIC RAILWAY JOURNAL of July 31, 1920, page 225.

New Publications

Women Street Car Conductors and Ticket Agents

Bulletin of the Woman's Bureau No. 11. United States Department of Labor, 1921. 90 pages.

This bulletin describes an investigation made in June, July and September, 1919, and in January, 1920, by representatives of the Labor Department. The hours, wages and conditions of work of women conductors in Detroit and Kansas City and of ticket agents on the street railways in Boston and Chicago were studied. The investigation was made after the dismissal on a large scale of women conductors and women ticket agents in New York City following changes in the statute relating to the employment of women.

The report explains that the service of conductors is quite different from that of ticket agents, and this should be understood because legislation may be drafted to regulate hours for both groups together, without special consideration of the very different demands of the two occupations. In conductor service, the report points out, the conditions were more arduous on the roads examined than would otherwise have been the case because the women were the more recent employees and the best runs were chosen by the men who had seniority. Nevertheless, the report finds there is "no particular reason to prove that the work of street car conductor is unfit for women." On the contrary it seemed to combine many advantages not always found in the traditional occupations for women.

Forty-six women conductors in Detroit told the investigators that they preferred the work to any other they had ever done before. Only one woman, who used to drive a rural free delivery wagon, liked her previous occupation better. The difficulties with which both the companies and the women were faced in complying with the law in Detroit and Kansas City emphasize, however, in the opinion of the investigators, "the need for a very careful study of local conditions before any phase of a transportation law is decided upon, with a view to determining possible local adjustments to make compliance more feasible and less likely to wreck disaster upon those it was framed to benefit."

On the question of ticket agents the records from Boston and Chicago "show that with the eight-hour day and six-day week, without night work and with a wage far superior to that paid women in any other occupation, the woman ticket agent and collector is an accepted and permanent fact in two large cities." The report is an elaborate one and contains many interesting tables.

Personal Mention

Cincinnati's New Director

Mr. Kuertz's Appointment as Street Railway Director a Complete Surprise

William J. Kuertz, assistant city solicitor of the city of Cincinnati, Ohio, has been appointed director of street railways to succeed William C. Culkins, who retires on May 1 to become executive secretary of the Chamber of Commerce.

The choice of Mr. Kuertz came as a surprise to him as well as financiers, business men and city officials. Three hours after he had accepted the position he was in conference with Mr. Culkins, pertaining to street railway affairs. Mr. Kuertz accepted the position after a brief talk with Mayor John Galvin.

W. J. KUERTZ

Mr. Kuertz has been assistant city solicitor for the past three years. He began the practice of law in 1904. He is a self-made lawyer, never having attended any law school, but educated himself while employed as an office boy and later as a stenographer connected with the law firm of Ellis, Kincaid & Rogers.

In selecting Mr. Kuertz, Mayor Galvin said he was sure that he had picked a man who was capable of filling the position. The mayor said his name had not been mentioned to him by any of the business factions about town who came forward with candidates for the position, but Saul Zielonka, city solicitor, and he had discussed Mr. Kuertz for the position. Mr. Kuertz, who is associated with Mr. Zielonka, has been engaged with him in every legal action brought by the city against the Cincinnati Traction Company. He is thoroughly conversant with every one of the many legal questions which are now pending in that connection.

A conference has been arranged between Messrs. Kuertz and Culkins for the latter part of this week, so that Mr. Kuertz can thoroughly familiarize himself with all the angles of the situation.

Vacancies on Indiana Commission Filled

Governor McCray of Indiana on March 23 made his first announcement concerning appointments to important state positions, naming three members of the Public Service Commission. George M. Barnard, Republican, Newcastle, was appointed to succeed Paul P. Haynes, whose resignation was announced in these columns several weeks ago. John McCardle, Republican, Indianapolis, was reappointed, and State Senator Maurice Douglas, Democrat, of Flatrock, was appointed to succeed Fred Bates Johnson, Indianapolis. The appointment of Mr. Barnard is for the unexpired term of Mr. Haynes from April 1 to May 1, 1924. The reappointment of Mr. McCardle is for a four-year term from May 1, and Senator Douglas will serve four years from May 1.

The appointments were regarded as the most important which were before the Governor.

Mr. Barnard is an ex-Mayor of Newcastle. He is at present corporation attorney for the city. He has appeared before the commission several times as a representative of the public in municipal cases and is highly regarded at the statehouse. Mr. Haynes, who resigned recently, became engaged in special practice of the law in Indianapolis on April 1.

Mr. McCardle is vice-chairman of the commission. He was first appointed by ex-Governor Goodrich four years ago. He has served on the commission during the important war and readjustment periods when many complex problems were presented to the commissioners for solution.

State Senator Douglas represented Shelby and Bartholomew counties in the recent General Assembly. He was elected State Senator in 1916. He served several times as a member of the House prior to his election as Senator. Mr. Douglas is secretary of the Indiana Federation of Farmers' Associations. Mr. Johnson, who is to be succeeded by Senator Douglas, let it be known some time ago that he was not an applicant for the appointment. He is expected to resume the practice of law in Indianapolis.

There are five members of the commission. E. I. Lewis, Republican, Indianapolis, is chairman. Glen Van Auken, Democrat, is the other member of the commission.

Long Service Rewarded

J. W. Harris, for Thirty-six Years Manager of California Cable Road, Becomes President

James W. Harris, of the California Street Cable Railroad Company, San Francisco, Cal., recently was elected president and general manager and chairman of the board of directors. Mr. Harris began work with the company April 1, 1879, in a construction gang, and has served continuously since.

His first work with the company was as a carpenter in the construction of an extension of the line from Filmore Street to Presidio Avenue. When the work on this line was finished Mr. Harris was transferred to the car shops and in three years he had been promoted successively to foreman and master mechanic.

In 1891 Mr. Harris was given charge of the extension of the line along Hyde-Jones and O'Farrell Streets and from Kearny Street to the ferry.

Following the death of James B. Stetson, president of the road, in 1909, Mr. Harris was made vice-president and general manager, and was given a place on the directorate. At that time J. Henry Meyer was elected president. At a directors' meeting following the death of Mr. Meyer a few weeks ago Mr. Harris was elected to his place, meanwhile retaining his post as general manager.

J. W. HARRIS

John T. McGhee, who had been assistant superintendent, was made superintendent, and Harry N. Stetson, son of the former president, was elected to the board of directors.

With a record of thirty-six years as superintendent and general manager of the California Street line Mr. Harris is one of the oldest American street railway executives in point of service.

Charles F. Arendt, for many years employed by the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been promoted to the position of chief inspector. He succeeds Harry West, who has been made night foreman at the company's carhouse in South Trenton.

Governor's Appointments Show Wide Choice

Political Affiliations Ignored in Selection of Members for New York's Transit Commission—State-Wide Commission All New

George McAneny, formerly president of the Borough of Manhattan and president of the Board of Aldermen, was named as chairman of the Transit Commission, a body created with the broadest authority the state can bestow on an administrative agency under its police powers, and with a mandate to clear up the muddled transit situation in New York City. The other appointments to the Transit Commission are Le Roy T. Harkness of Brooklyn and Major General John F. O'Ryan of New York. William A. Prendergast of Brooklyn will be chairman of the State-wide Public Service Commission. His associates will be William R. Pooley of Buffalo, Charles Van Voorhis of Rochester, Oliver C. Semple of New York, and Charles G. Blakeslee of Binghamton. All these appointments, which were sent by Governor Miller to the Senate on April 16, have been confirmed.

©Paul Thompson
LE ROY T. HARKNESS

Photo by Paul Thompson
GEORGE McANENY

©Underwood & Underwood
MAJOR-GEN. J. F. O'RYAN

©Underwood & Underwood
W. A. PRENDERGAST

MR. McANENY has long been active in public life. Among his accomplishments during his municipal service was his long fight in the Board of Estimate for the adoption of the dual subway system.

Among other positions of public service Mr. McAneny has been president of the Board of Aldermen and president of the Borough of Manhattan. He started his career as a newspaper man, going back to it as associate business manager of the New York *Times*, in 1915, a post he relinquished only recently.

Mr. McAneny was born in Greenville, N. J., on Christmas eve, 1869. He was educated in the public and high schools of Jersey City, later studying law, although he never practiced at the bar. He served on the committee which framed the municipal home rule amendments to the State Constitution adopted in 1894.

Le Roy T. Harkness, former legal adviser to the New York Public Service Commission, is credited with signal service in safeguarding the city's interest in the drafting of the dual subway contracts. He has had a wide experience in New York traction affairs because of his long service with the commission.

Recently, with the co-operation of Charles E. Hughes and Oliver C. Semple, Mr. Harkness undertook a study of the traction situation in New York at the request of the Merchants Association. Mr. Harkness paid particular attention in his report to the underlying securities of the city's transit lines and their relation to the actual value of the properties. The report is in the hands of the Merchants' Association, which has already made known its willingness to offer it to the new commission.

John F. O'Ryan, although a lawyer by profession, has long been a soldier. He enlisted as a private in the National Guard in 1897, and after a succession of promotions became a major general intrusted with the command of the Twenty-seventh Division during the war. General O'Ryan is one of the few civilians holding a diploma from the War College, and was the only militia officer to command a division in the A. E. F. He was born in New York in 1874.

Of the commissioners who will serve on the transit board Mr. McAneny and General O'Ryan are Democrats. The former is classed as an independent, while General O'Ryan has been favored by Tammany Hall for positions in the public service. Politically Mr. Harkness classes himself as an independent Republican. All the new members of the Public Service Commission are Republicans. The salaries of each commissioner will be $15,000 a year.

William A. Prendergast is an authority on municipal financing and accounting. Throughout his long political career, which brought him into the office of Comptroller of the City of New York for the first time in 1910, Mr. Prendergast has been active in discussions of the city's transportation problem. Recently he has attacked Hylan's "do-nothing" policy, asserting that the Mayor by his attitude had forfeited the right to interfere. He has been a strong advocate of Governor Miller's traction plan.

Mr. Prendergast was born in New York on May 23, 1867, and attended public schools in Manhattan and Brooklyn. He entered business at the age of fourteen.

Oliver C. Semple is a New York lawyer, who has had an extensive experience in traction affairs. He aided in the drafting of the original Public Service Commission law and was himself counsel to the commission between 1907 and 1918. He was largely responsible for the drafting of the revision of that law and of the revision of the rapid transit act of 1920. He also assisted in drawing up the Interborough and the Brooklyn Rapid Transit contracts in 1913. Mr. Semple has been a consistent supporter of Governor Miller's traction plan, declaring that home rule was not involved in the situation and that "'public interest' means something more than the interest of one city or its people."

Charles G. Blakeslee of Binghamton is a Republican power in Broome county. He is a lawyer by profession, but an engineer as well. He has been corporation counsel of Binghamton, and has appeared at legislative hearings in opposition to the Governor's traction bill.

William R. Pooley was colonel of the old Seventy-fourth of Buffalo. He is a lawyer by profession.

Charles Van Voorhis is a lawyer of Rochester, of the firm of John Van Voorhis & Sons. During the war he served in the navy.

The Transit Commission is approaching a most complicated task. Questions of law, finance and the mechanical details of subway, elevated and surface operation must be considered in all their aspects before a single comprehensive plan at which the Governor aims can be evolved.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Cut of Ten per Cent on Steam Flow Meters

Considerable Interest Shown in This Product as Means of Checking Boiler Room Costs—Prompt Deliveries

One of the large manufacturers of steam flow meters has reduced prices 10 per cent effective April 19, but so far as can be learned other producers have not taken similar action. Considerable interest is being manifested in flow meters on the part of electric railways and power companies, it is reported, as a means of checking up boiler room costs and effecting economical operation. Demand, of course, under present adverse general market conditions, is not as large as has been the case, but at the same time a fairly good volume of business is being placed, several producers report. As a rule manufacturers do not stock this class of goods but at the same time deliveries are prompt and can be made in ten days or under.

Cement Prices Drop 60 Cents per Barrel

Demand Is on the Increase, but There Is Little Likelihood of a Shortage This Year

Consumers of cement are now able to buy this product at 60 cents per barrel cheaper than it cost the first of this month owing to a reduction in the price of bags in which cement is shipped. These formerly cost 25 cents each but manufacturers announced about the first of the month that on April 10 they would begin to ship cement in bags for which they now charge 10 cents each, thus accounting for the decrease noted above. The retail price of cement delivered at New York is now $3.50 per barrel. This compares with a peak price of $5.10 per barrel which was still in effect early last November.

Producers express satisfaction over the way the market is beginning to improve. Electric railways are doing very little buying for there is not much new track construction work under way this spring, apparently, but on the other hand the building industry is recently showing noticeable activity. Since February the curve of demand has climbed upward and at the present time shipments are said to be very little behind 1919 which was a fairly normal year.

Good stocks and immediate shipments prevail with producers in general, and despite some reports to the effect that a cement shortage will again prevail later this year there seems little likelihood of that. The maximum annual productive capacity of the country is estimated at 147,000,000 barrels, and last year, which was considerably above the average in demand, only about 96,000,000 barrels were shipped. The limiting factors in the cement supply for 1920 were railroad tieups, labor and coal shortages, and all these conditions are now very favorable for a large production if necessary.

Railways Not Turning to Used Equipment Market

Plentiful Supply of Material Awaits Anticipated Increase in Buying, but Present Demand Is Light

In view of depleted finances which, with many electric railways, has been the main factor in curtailing buying of new equipment to low levels, it might be thought that traction companies are turning to the second-hand market at this time as a source of supply. This is a logical conclusion, dealers in that field state, and ordinarily would hold true, especially in view of high prices of new material. At the present time, however, representative companies dealing almost exclusively with used electric railway products report that the market is extremely quiet. The chief factors inducing this inactivity are the declining state of the market, lack of finances and the need for labor readjustments on the part of railways.

There is a strong potential demand for good second-hand cars, trucks, motors and control equipment, electric locomotives and also for power plant equipment. With the large needs of electric railways in this respect in view, dealers are optimistic that with improving business conditions they will find a strong demand later in the year. Acting on this basis at least one of the leading factors in the market is going right ahead and stocking material but others are buying little or nothing to carry in stock. Those who are pursuing the latter course may be induced to do so by the fact that nearly all classes of material are in plentiful supply and can be picked up as needed, and furthermore, dealers' stocks are fairly well filled as it is.

A feature of the current demand is that most interest, it is stated, is being shown in double-truck rather than single-truck equipment to be used for one-man operation. Prices may still be said to represent peak quotations on second-hand material, for decided reductions have not been made, but on the other hand it must be remembered that dealers in used equipment advanced prices but sparingly the past few years.

Start of New Coal Year Finds Production Drastically Cut

Market Is Quiet with No Increase in Demand from British Strike—Prices Firming Slightly

With the ending of the coal year 1920-1921 on March 31, now three weeks past, little actual improvement is seen in the slump which the bituminous coal market is undergoing. Expectations of an increased demand resulting from the British coal strike have not been realized, and with the passing of the danger of a general strike in Great Britain there seems little likelihood of any increased buying from that source. The strike has now been in effect three weeks, and though many inquiries for coal from abroad have been received actual orders are lacking, for European markets are overstocked, too.

Though the present coal market is extremely quiet and consumers are apparently indefinitely postponing placing contracts signs are not wanting of a slightly firmer tone to the market. Production has declined steadily since last November and is now ranging around the unprecedentedly low figure of 6,000,000 net tons per week, according to the Geological Survey. Except for the extraordinary period of the coal strike in November 1919, this rate of production is lower than at any previous time since early in 1914.

PRICES AT PRESENT ARE LOW

Forced sales of steam coal are now fewer and prices, as reflected by the weekly index of *Coal Age*, are not only making a determined stand against further reductions but are also even firming slightly. As a matter of fact present prices are equivalent to those of two years ago, though labor costs have risen some 40 per cent since then. Furthermore, with reduced man power and an increasing number of coal cars in bad repair on steam roads, prospects of a car shortage on a return of anywhere near normal demand for coal are increasing. Taken all in all, indications point to a decided jump in soft coal prices next autumn.

The flat-footed refusal of union miners to consider any reduction in their scale of wages, together with the feeling that freight rates should be lower, are two factors that are important in delaying the return of buying confidence in the coal market. With a large part of the miners idle, however, and with the current volume of business of steam railroads as evidence of the crying need of rate readjustments both of these conditions bid fair to be remedied.

Tie Producers See Better Times Ahead

Increased Demand Generally Expected—Stocks Decreasing and Production Curtailed to Minimum—Prices Soft

Producers of wood ties see several factors in the present market which lead them to expect an increased demand later this year. The payment of money to steam roads under the Winslow Bill should result in additional ties being bought, it is stated. Labor prices are coming down and with the influx of immigrants under way once more the expensive labor factor in track construction should be greatly minimized. Furthermore, there has been a general buying strike due to expectations of lower prices, for one thing, and as prices have now receded a considerable amount it seems likely that the latter half of the year will show more activity than the first.

Production, it may be safely said, is confined almost entirely to actual orders, and meanwhile stocks are decreasing rather than increasing. As a matter of fact present tie stocks, especially of southern yellow pine, while adequate to make very prompt shipments, are not extra large.

There is a good deal of shopping done on the part of buyers and quotations consequently are soft. While labor costs at southern tie camps have been reduced as much as 50 per cent in some instances, it is reported, and water freight rates have also come down slightly, there seems to be a chance of still lower prices prevailing on behalf of both these factors. A representative producer reports that yellow-pine ties are about 20 cents apiece lower now than on Dec. 1. An idea of the market can be gained from the price paid by a large steam road recently for some yellow-pine ties, which was $1.85 each delivered f.o.b. car for the heart-center ties and $1.35 for the sap tie.

Several of the large steam roads have contracts for ties now in effect at the high prices prevailing early last fall. Some of these contracts still have a few months yet to run and are undoubtedly a factor in holding up the market. One road for instance has been forced to pay $1.85 for white oak ties, 8½ ft. long, 7 in. x 9 in., while the market at present is about 50 cents lower than that.

Lower Prices of Armature and Field Coils

Since the first of the year armature and field coils have dropped about 25 per cent, a large producer reports. This company's latest reduction was a cut of 10 per cent effective April 15. Another manufacturer dropped prices about 5 to 10 per cent on March 25.

Good stocks are being carried by producers and consequently deliveries are exceedingly prompt. The famine conditions of supply that prevailed last year have long since entirely disappeared. One factor in maintaining the good supply has been the mild winter just past which delt kindly with railway motors in the matter of burnouts.

Inactive Market for Car Curtains

With Prompt Deliveries and Considerably Lower Prices, Roads Are Not Repairing Summer Curtain Equipment

Producers of car curtains are one in reporting that electric railways are not repairing summer car equipment so far as curtains are concerned. For all the buying that is being done in this market at present the cars might well be run without curtains and in fact, it is stated, there is some tendency shown at present to buy new cars without curtain equipment in order to cut down expenditures. Not only are the electric lines inactive buyers but business in the steam road field is also absolutely dead, too. There is some hope expressed that sales will increase the latter part of the year, but on the other hand, some producers say they will be satisfied to make expenses this year. The one thing that would most aid a return of business, it is thought, is lower labor costs on railways.

In view of existing market conditions producers have very much curtailed their output, production in one representative case, for instance, being at only 25 per cent of capacity. Stocks of raw material now carried are ample, even somewhat larger than present conditions warrant, and deliveries are prompt, only ten days or less being required to finish an order.

The cost of cotton has of course taken a tremendous slump since the peak price of last summer, spot cotton which was worth over 40 cents a pound at that time now being quoted at about 12 cents, New York. Wages have receded slightly too, cuts of about ten per cent having been put into effect in the plants of some curtain manufacturers. Consequently prices of the finished product are considerably lower than the top price of 1920, just how much the reduction has averaged not being available, though one manufacturer reports 35 per cent.

Steel Corporation Drops Price on Sheets

The United States Steel Corporation has lowered its prices on sheets $7 to $14. This brings an even market again with corporation and independent mills on the same level. Black sheets, Pittsburgh, are 4 cents, blue annealed are 3.10 cents and galvanized are 5 cents. So far there has been no disposition to shade these prices and even with the former reductions there was little appreciable increase in demand. But with this lowered price it remains to be seen what the mills will do if the demand does not soon pick up. Sheet mill operations are running only at about a 30-per cent rate.

Iron Conduit Lower by from 5 to 10 per Cent

In line with general reductions in steel prices within the past few months—and more particularly in view of the recent drop in prices of the United States Steel Corporation on merchant pipe and other products—general reductions on conduit have been made by manufacturers. The decrease ranges from about 5 per cent to slightly more than 10 per cent on different sizes and became effective on April 14, 15 and 18 with various producers.

The general increase in discounts that was made is the same in several instances and amounts to two points on ½-in. conduit, three points on ¾-in. and 5 points on 1-in. and larger sizes, both black and galvanized. The discount on elbows and couplings is increased by three points. Incidentally, prices of the United State Steel Corporation on standard steel pipe, the raw material of conduit, have been decreased in the same proportion as the above.

Rolling Stock

Princeton (West Va.) Power Company, recently purchased two of the emergency Hog Island cars and three others released by the Bangor (Me.) Railway & Electric Company.

The Detroit (Mich.) Municipal Railway, has not yet placed contracts for the 100 Peter Witt cars mentioned in the March 19 issue and new bids will probably be called for. The company has, however, ordered twenty-five additional safety cars from the Osgood-Bradley Car Company, Worcester, Mass., at a cost of $6,695 each f.o.b. Detroit. Deliveries are to start within sixty days at the rate of two cars a day.

The New Bedford & Onset Street Railway Company, New Bedford, Mass., is converting its double-truck, closed passenger cars for one-man operation. Three cars are practically completed and these are expected to be placed in operation on the company's Middleboro division about May 15. Ten cars in all will be converted. They are Wason forty-seat cars. The summer line between Onset and Onset Junction will be operated by these, but on the line running into the city of New Bedford, two men will be used, the conductor boarding and leaving the car at the city fare limits.

Franchises

Linnton, Ore.—J. B. Schaefer, S. P. Parr and Louis Osberg have obtained a franchise from the County Commissioners to operate an electric railway along St. Helens road between Linnton and Twelfth and Burnside Streets. The franchise, approved as to form by Deputy District Attorney Pierce, is to continue in force until Aug. 20, 1940. A 10-cent fare is provided.

Track and Roadway

San Francisco (Cal.) Municipal Railway.—City Engineer O'Shaughnessy of the city of San Francisco, Cal., has been instructed by the Supervisors to prepare estimates of cost for extending the San Francisco Municipal Railway to the Ocean View District.

Evanston (Ill.) Railway.—This company will lay about 250 ton of new rail, replacing present track, this summer. Work is now in progress to replace all of the overhead copper. These replacements will bring the physical condition of the Evanston property up to a high standard.

Androscoggin & Kennebec Railway, Lewiston, Me. — The Androscoggin & Kennebec Railway has placed orders for one G. E. automatic substation control and one Westinghouse 500-kw. rotary converter with transformer and switchboard.

Tulsa (Okla.) Street Railway.—According to the city attorney the Corporation Commission will instruct the Tulsa Street Railway to double-track the Kendall and Main Street lines, and to spend about $388,000 within the next year in extensions and improvements.

Brantford (Ont.) Municipal Railway.—City Council has passed by-laws providing for the issue of debentures for the sum of $80,000 for extension, improvements and addition to the Brantford Municipal Railway, and for the issue of debentures for an additional sum of $40,000 for the construction of the St. Paul's Avenue subway.

Ohio Electric Railway, Springfield, Ohio.—The work of eliminating the grade crossing at Mount Street on the Norfolk & Western tracks will be delayed because of the inability of the Ohio Electric Railway to perform its share in the work. The Ohio Electric Railway is in the hands of a receiver.

Blue Ridge Traction Company, Danielsville, Pa.—The Blue Ridge Traction Company expects to build an extension during this year of three miles from Walnutport to Palmerton. Bids are now open for the construction work.

Montreal (Que.) Tramway.— Construction of direct tramway line to Model City is contemplated by Montreal Tramways.

Dallas (Tex.) Railway.—The Dallas Railway has begun work on the Seventh Street extension of the Tyler Avenue line in Oak Clix, one of the extensions to which the company was committeed under the terms of the franchise granted the Strickland interests in 1917. Work on this line had been postponed and additional time granted by the city on several occasions, due to the unsettled conditions and the inability of the traction company to purchase material. The line will be single track, and will cost approximately $100,000, according to estimates of the engineers of the traction company.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway expects to install eight road crossing signals shortly.

Newell Bridge & Railway Company, Newell, W. Va.—The Newell Bridge & Railway Company expects within the next two months to refloor its bridge over the Ohio River. White oak ties 6 in. x 8 ft. x 8 in. will be used and white oak planking, largely 3-in. stock.

Power Houses, Shops and Buildings

Cincinnati (Ohio) Traction Company.—Preparatory to purchasing power from the Union Gas & Electric Company, the Cincinnati Traction Company has asked the city street railway director, to approve an expenditure of $380,000 to equip seven transformer stations in different parts of the city. Three of the stations will work automatically. The contract for purchase of the power goes into effect in September.

Professional Note

Lawrence P. Crecelius and Victor B. Phillips announce their association in the firm of Crecelius & Phillips, consulting, constructing and operating engineers with offices at 1302 Hanna Building, Cleveland, Ohio.

Trade Notes

Consolidated Steel Corporation announces the removal of its offices on April 16 to the Cunard Bldg., 25 Broadway, New York City.

The Superheater Company announces that after May 1, 1921, its general offices will be moved from 30 Church St., to 17 East Forty-second St., New York City.

The Corliss Carbon Company, Bradford, Pa., manufacturer of Corliss carbon brushes, has increased its capital stock from $500,000 to $1,000,000.

The Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, announces the opening of an office at 401 National Bank of Commerce Bldg., St. Louis Mo., with C. P. Lohr as manager.

Victor T. Goggin, has severed his connection with Fred T. Ley & Company, Inc., as New England sales manager, to associate himself as contracting engineer with Dwight P. Robinson & Company, Inc., New York.

Bemis Car Truck Company, Springfield, Mass., has completed arrangements with James H. Denton, whose office after May 1 will be in the Marbridge Bldg., 1328 Broadway, N. Y. City, whereby the latter will represent the company in the territory comprised of New York, Pennsylvania, New Jersey, Delaware, District of Columbia, Virginia and Maryland. Mr. Denton in addition will continue as agent of the companies he has previously represented.

The Haskell & Barker Car Company, Michigan City, Ind., in its annual financial statement recently issued shows gross profits of $3,789,390 for the year ended Jan. 31, 1921. Expenses for repairs, renewals and maintenance amounted to $511,070, $300,000 was allowed for depreciation, and estimated federal taxes were $700,000, leaving a balance of $2,278,319. Quarterly dividends paid during the year totaled $880,000 so that the sum of $1,398,319 remained to be added to surplus. The report states that the non-payment of money owed the railroads by the government was effective in bringing to a halt the buying movement of railroads. Recent remedial legislation is expected to bring relief in that respect.

International Combustion Engineering Corporation Holdings.—What has been characterized as one of the biggest accomplishments in the development of stoker business and combustion business generally thus far is the organization of the International Combustion Engineering Corporation to control the Combustion Engineering Corporation of New York and the Underfeed Stoker Company, Ltd., of London, England. It owns almost all the stock of both these companies and of course controls also their subsidiary companies and representatives. The Underfeed company occupies in England a position similar to that of the Combustion company in this country, and the former company has agencies and representatives throughout the world.

New Advertising Literature

Solder.—The Union Smelting & Refining Company, Inc., St. Charles Street, Newark, N. J., is putting out a new handy-package "Usarco" solder in stick form for electrical use.

Catalog.—American Jobbers Supply Company, Woolworth Building, New York City, has recently issued bulletin No. 7 covering its line of crossarms, line hardware, glass insulators, wood pins and brackets.

Evaporators—"Lillie Evaporators for Waste Waters and Solutions Generally" is the title of bulletin 11 distributed by the Wheeler Condenser & Engineering Company, Carteret, N. J., describing the Lillie evaporator.

Pumping Equipment. — The Goulds Manufacturing Company, Seneca Falls, N. Y., has issued a catalog describing the Goulds "Autowater" system, electrically-driven pumps, etc. The company is also circulating a small booklet giving instructions for the installation, operation and care of Goulds "Hi-Speed" pumps.

Screw Thread Standards.—The Bureau of Standards, Department of Commerce, Washington, D. C., is distributing miscellaneous publication No. 42, entitled "Progress Report of the National Screw-Thread Commission." The report contains standards for screw threads ascertained and established by the commission.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, April 30, 1921 *Number* 18

Lest We Forget the War Veterans

TWO years ago some four millions of men who had been wearing the khaki of the military service or the blue of the naval arm were in process of being discharged from the duties they had performed so splendidly and they were seeking to re-enter the normal fields of industry. To a very considerable extent, employers endeavored to take care of all returning former employees by reinstating them in their old jobs or supplying better ones. The great industrial activity of 1919 and the early part of 1920 made it comparatively easy for many others to find lucrative employment. Patriotic organizations helped by the exertion of every legitimate means to aid the returned soldiers to find jobs. Now the tide has turned. The industrial depression has resulted in the throwing of thousands of persons out of work, among them many former service men, and there has been increased activity on the part of the various organizations of veterans for bonus legislation and preferential treatment in civil service appointments.

Whether the payment of additional compensation in the form of a bonus to veterans is advisable at this time is debatable, but the street railways and manufacturing companies are in a position to help the situation to some extent by not forgetting to practice a reasonable amount of preference in the employment of veterans wherever it is possible to do so. While forces are not being increased to any extent at present, there is always a certain amount of turn-over, even in the dullest of times. It is worth remembering that these four million or so of young men spent months of anything but ease or comfort at an average wage of a trifle over $30 a month, while those who remained at home were seldom making less than that much per week, and in the great majority of cases far more. Hence it would appear that the ex-service man can well receive preference among two or more prospective employees, other conditions being equal.

Situation in New York City Reviewed

FOR those who wish to have a brief résumé of the New York transit situation, the review by Herman A. Metz, published elsewhere in this issue, should be most welcome. Mr. Metz has had an active part in much of the history which he recounts, having been Comptroller of the city of New York from 1906 to 1910, and he points out clearly that the only way to solve the problem is to take the question out of politics and find out what the present conditions are, and this the new commission is empowered to do.

The result of the active debate on Governor Miller's plan, both before and after the passage of the act, has been greatly to help the citizens of New York to understand the traction problem, and addresses by Mr. Metz and others have aided in this general education. The personnel of the new transit commission gives promise of a thorough study of the situation, coupled with an intelligent solution of it, although it may be expected that the city administration will exert every effort within its power to block the progress of the inquiry by legal means.

The traction situation in New York is admittedly complicated, involving as it does a large number of companies, some being lessors and others lessees, some being solvent and others not, and some being parties to special agreements with the city while others operate under franchises as old as any in the country. Nevertheless, similar problems, differing in complication only in degree, have been successfully solved in other cities in this country, and there is no reason to expect a failure in New York, once the commission gets to work.

A Budget Is Good, but It Need Not Be a Straitjacket

THE necessity for applying the brakes to operating expenses on electric railway properties has brought the budget to the fore as a factor in cost control. On many properties the budget system has been successfully used for a long time. It has helped them to keep going when without it they would not have known where they were headed until too late to change their course. On the other properties the budget plan has been installed recently, but is already bringing good results. There are still, however, many opportunities to inaugurate this plan.

To be successful a budget system must interest the individuals who actually control the spending of money. It is not sufficient for the manager and the comptroller to agree on the amounts that can be allotted to the several departments. Undoubtedly these officials have authority to tighten up on the pursestrings as they see fit, but they cannot inculcate and foster the spirit of real company thrift unless they can secure co-operation on the part of the ultimate spender. This is the factor which insures the success of budget plans like those used by the Boston Elevated Railway, the United Railways & Electric Company of Baltimore, the Cincinnati Traction Company and the Rochester & Syracuse Railroad, discussed in recent issues of this paper respectively by E. M. Flint. C. D. Emmons and W. C. Culkins, and in the present issue by D. E. Crouse.

Granted that the ultimate spender's interest in the budget must be secured, it is up to the management to enlist this interest. He must first be convinced of the necessity for economy and be inspired with a real desire to insure the profitableness of operation of the property. He must have demonstrated to him the reasonableness of the proposed limitations on his spending. And to crown it all he must know practically continuously just how well he is controlling the outgo, and must realize that if he makes good he will receive proper appreciation of his efforts.

At the same time there must be a flexibility to the budget. Circumstances arise which demand frequent readjustment. Shifting of allowances from department to department, with full consent of those concerned, may be necessary. This can easily be accomplished through co-operation, and only so.

In making the budget interesting, different means must be used. To some men graphic presentation, as used by Mr. Crouse's company, makes the strongest appeal. Others prefer "figures." They should have what they want as to form, just so the facts are made to grip them.

Schedules Committee Report Is to Be a Valuable Study

QUESTIONNAIRES sent out by the committee on economics of schedules of the T. & T. Association give promise of a valuable report on this important subject at the next convention. This committee has divided its work into three sections, the first covering definitions and analyses of car-hours and crew-hours, the second having to do with variable running time and the third with recent methods for improving handling of traffic in congested districts.

The discussion on the first subject at last year's convention developed the need for a standard classification of car-hours as between revenue and non-revenue time. One company was reported as having about 19 per cent of "bonus" time in the car-hours paid for. The burden of this on cost of operation is apparent. Benefits from a clearer understanding of the subject will be twofold. Executives should realize the desirability of regaining some of the costly working conditions which they have conceded to their employees in previous contracts, and it will be possible to get a real comparison between running time on various properties.

The second subject is somewhat allied to the above. It is undoubtedly true that many slipshod methods exist in the making of schedules, and it is hoped that the companies will agree upon more scientific methods for preparing time-tables and making changes promptly to suit traffic demands.

Methods developed in recent years for improving the handling of traffic in crowded centers are numerous, and while there may be good reasons for their non-adoption on certain properties, the committee may perform a useful service for the industry by calling attention to the arguments for and against their use in particular circumstances. Some of the methods listed in the committee's questionnaire are: Loading platforms, skipstops, safety zones, queue loading, double berthing, trailer cars, jitney control, street collectors, elimination of left-hand turns, semaphore control and turnbacks outside of congested districts. All these factors have a bearing on the movement of traffic as well as on the comfort, safety and convenience of passengers. If by the employment of one or more of these methods the car-hours can be reduced, the effect will be apparent on the cost of operation and incidentally on the rate of fare. Until a railway operator is convinced as to the effectiveness of such methods for the particular situation with which he is concerned he will not become an enthusiast. He must become a convert himself before he can convert city authorities or his patrons to the need for progressive methods.

The committee is doing well to stir up interest in such ideas, and when the matter gets around to a report before the convention a general discussion should be arranged with a view to getting the fullest possible light on the subject. The public must be educated to the fact that anything which facilitates the movement of traffic is in its interest.

"Don't Hate Your Customers" Is Good Advice to All

HOMELY principles of salesmanship formed the foundation of the talk of P. S. Arkwright, president of the Georgia Railway & Power Company, printed in last week's issue of this paper. This was a talk to platform men, but a careful perusal of it is recommended to all railway men, particularly managers and executives. It is none too strong to say that there are many of the latter who can, as advantageously as platform men, absorb some of this philosophy and expose themselves to the contagious enthusiasm of Mr. Arkwright. He calls attention to the one necessary element in any salesmanship activity when he points out with telling emphasis that the riders on the cars are the "customers." Not that this idea is new, but a good many people seem to have forgotten it. Confidence in, and respect for, a customer is one of the salesman's first requisites; this and the fact that he has something worth while selling and knows it makes his salesmanship possible. Mr. Arkwright would probably be the last man to claim or even admit that he is a salesman, but his talk is certainly the essence of salesmanship.

It is instructive to study the salesman-customer attitude in another business, namely, the hotel. The hotel, more than any other private business institution, approaches a public utility in its nature—it has service to sell only if and as it has capacity to furnish it. Obviously a room that is empty one night cannot be rented twice the next night to make up for it, any more than an empty car can carry a double load the next trip to make up the loss. Now who fails to notice the difference in manner of the hotel manager in the days when hotel rooms were at a premium and the days when there are more rooms than patrons? It is his manner under the latter conditions which is appreciated and which makes one want to come again.

A little more constant appreciation of these facts is worth while in the railway business. It means practicing salesmanship. It means conducting your business as if you had a competitor. It often means the difference between success and failure. Confidence in your customer, respectful treatment of him and appreciation of the value of what you have to sell him is worth while all down the line.

Executives Should Furnish Inspiration as Well as Education

THERE is an additional feature of the talk to platform men by Mr. Arkwright which is worth attention. It is another instance of the right sort of relation of executive to employee. Various examples have from time to time been mentioned in these columns, but it is a subject which cannot be overemphasized. There are two elements to this relationship. One is education and the other is inspiration.

The educational features—the giving of fact and viewpoint—of this talk are self-evident. But inspiring as the manner or wording may be, the full degree of inspiration can only be attained by the right sort of personal presentation. In this case it had this and railway men can usually give it. Many of them have come up through the ranks. They can talk in the language of the employee and from his point of view, and give him the necessary inspiration.

What is urged here is more constant practice of the act.

The Dull-Time Crop of Jitneys

THE number of jitneys in evidence is increasing very noticeably in many cities. This is undoubtedly a direct result of the widespread unemployment. Men who prospered during the flush times and bought automobiles, and are now out of a job, are getting into the free-lance jitney business as a temporary means of livelihood. Even in Terre Haute, Ind., where the frequent safety-car service supplied a competition that reduced the number of jitneys from more than 200 to nine not strictly competitive, there is now a considerable number of them engaged in picking up the nickels, with little regard for anything else. This flocking of the jobless into the jitney business is particularly noticed in those cities which permit them to operate without restriction as to route and schedule and free from bonds to cover liability in the protection of patrons and other users of the streets. Without any of the responsibilities of the street railway company, this dull-time crop of jitneys, coming as it does when there is a natural falling off in the traffic available, presents a competition that is glaringly unfair. It points to the desirability of securing such ordinances as will place the jitney competition on a fair basis.

The Place of the Engineer in the Electric Railway Organization

DUE TO wartime "suspended animation" in electric railway construction and rehabilitation, the engineer in this branch of industry has not been as conspicuous as he is normally. But he is there, nevertheless, and the work that he has been doing in maintaining the track, the rolling-stock and the power supply has been an important factor in the success of the railways in keeping up service under discouraging conditions. Good engineering will always form the basis of good transportation service, and a recognition of this fact by managers and the engineers themselves is necessary, not only in order that technical men retain their rightful place in the transportation field, but also because it is only thus that good quality of service can be insured.

In an address before the Cornell Society of Engineers, at a meeting held in New York City on April 21, Frank Hedley, president and general manager Interborough Rapid Transit Company, said some pertinent things about engineers. Mr. Hedley certainly knows engineers and engineering. He has to do so properly to select department heads for his great transportation machine. Moreover, he believes in engineers. Listen with the Cornell "grads" to what he says: "It is not essential for a man to have a technical college education. But this one thing is necessary. If he doesn't get his technical education in college he must get it after he starts to work. And it is difficult to get a technical education after putting in a hard day's work. The principal thing is that to be successful a man must show that he can do the job better than some one else, whether he has a college education or gets his technical training while doing practical work. A man who does this cannot be held back."

This paper believes with Mr. Hedley that the engineer is necessary in transportation work, and that the real engineer will forge ahead. The fact that he got his technical training in the railroad shop, and in construction and operating work, does not render Mr. Hedley oblivious to the advantages of the right kind of college training. But the main thing is to have real engineers in the business, college trained or otherwise.

And it is proper to add that, having them there, the "powers that be" should assign them a status commensurate with the importance of their work.

Fares Must Be Sufficient to Meet Depreciation

PUBLIC authorities in control of rates are gradually recognizing that utilities must make adequate provision for depreciation out of earnings and the consequent necessity that fares must be sufficient to permit substantial allowances for this purpose. In both the steam and electric railway industry there have been many examples of the fixing of rates by one body and the fixing of expenses by a second, as an arbitration board or national labor commission. But depreciation is an expense which accumulates without regard to either rate-fixing or expense-fixing bodies of any kind. The omission of depreciation from the year's expense account or from the balance sheet does not affect its existence in any way.

The trustees appointed to operate and administer the affairs of the Boston Elevated Railway under the public control act have met this issue squarely, as is indicated by the statements in their annual report, reviewed in the financial department of this issue. After recognizing the necessity of a change in policy as regards provision for depreciation, they state flatly that no sane management would fail to lay aside from current receipts a sufficient amount to meet renewal and replacement of property that is wearing out. They offer the public no immediate prospect of any decrease in the present 10-cent fare, giving among other reasons for the general advance in fare on practically all street railways this matter of depreciation.

There is nothing new about this situation as far as most of the men in the railway industry are concerned. The trouble has been that, with a shrinking margin between receipts and expenses, the managements have been compelled to seek some means of staving off bankruptcy. Other creditors could not be put off; depreciation allowances, but not the depreciation itself, could be.

The trustees are being subjected to criticism for this position by some elements of the public which are looking only for a possible wedge demanding fare reduction, but the fact should be recognized that every cent provided now for depreciation goes back to the public in better property, which means better service, and in the end the result will be a net saving to the public.

Quotation from the Federal Electric Railways Commission Report

No. 18

ALL transportation service is for the public. Jitneys and automobile buses cannot be repressed merely for the sake of compelling people to ride on the street cars . . . . Unnecessary and destructive competition ought not to be permitted, and the community at large should conserve the established facility that still is and promises to continue for an indefinite period the principal means of local transportation . . . If the street railways are to be allowed the benefits of even a qualified monopoly, they should be required to fulfill their obligations. They must render service that is adequate and convenient at rates that are attractive.

Budget System Which Produces Results

The Rochester & Syracuse Railroad Employs a Simple Means for Predicting Income and Outgo and for the Guidance of Department Heads in Limiting Expenditures—Graphical Presentation of Data Is Largely Used—Close Co-operation Throughout Executive Staff Supplements Budget

By D. E. CROUSE
Chief Engineer Rochester & Syracuse Railroad, Syracuse, N. Y.

FOR some time the Rochester & Syracuse Railroad has been using a budget system which has resulted in increased efficiency, better co-operation among departments and a general reduction in cost of maintenance that has well justified the small outlay on bookkeeping. The method used in building up the budget and the way in which the system functions are briefly as follows:

PREPARATION OF THE TRIAL BUDGET

Some time before the beginning of the calendar year for which the budget is being constructed the several departments of the company are furnished by the purchasing agent with a price sheet, of the general form shown in Fig. 1. This shows the latest prices of the several materials used by the particular departments for which the information is furnished and the quantities purchased during the current year. By the use of this sheet and comparison with similar previous sheets the department has a basis for arriving at an estimate of the cost of materials for the ensuing year.

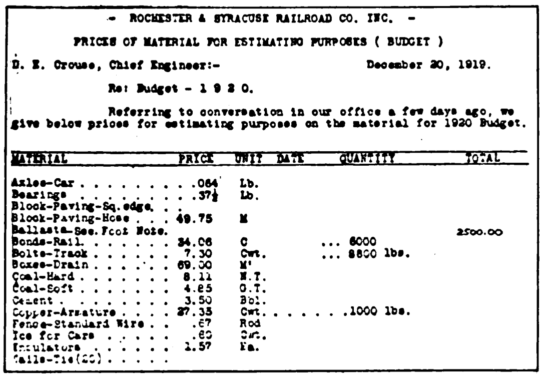
After a department head has made a careful analysis of the actual cost sheet for labor and material for the preceding year, which is made up in the form indicated in Fig. 2, he builds an estimate for the coming year and details the items which make up his proposed total expenditure.

We have found that unless department heads are furnished by the auditing department with the costs of materials and labor, itemized separately, they cannot analyze their costs correctly nor build up a budget intelligently.

After the department heads have set up their estimated expenditures under the several standard account numbers the trial budget is ready for criticism by the heads of other departments.

TESTING THE TRIAL BUDGET

The trial budgets are submitted to the scrutiny of the "cabinet," which consists of the auditor, the purchasing agent, the claim and tax agent, the general



- ROCHESTER & SYRACUSE RAILROAD CO. INC. -

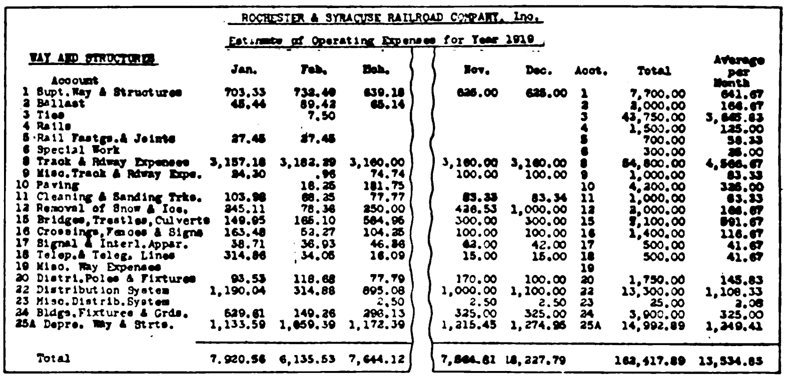
PRICES OF MATERIAL FOR ESTIMATING PURPOSES (BUDGET)

D. E. Crouse, Chief Engineer:- December 20, 1919.

Re: Budget - 1 9 2 0.

Referring to conversation in our office a few days ago, we give below prices for estimating purposes on the material for 1920 Budget.

MATERIAL	PRICE	UNIT	DATE	QUANTITY	TOTAL
Axles-Car	.064	Lb.			
Bearings	.37½	Lb.			
Block-Paving-Sq. edge					
Block-Paving-Hose	49.75	M			
Ballasts-See. Foot Note.					2500.00
Bonds-Rail	34.06	C		... 6000	
Bolts-Track	7.30	Cwt.		... 8800 lbs.	
Boxes-Drain	69.00	M'			
Coal-Hard	8.11	N.T.			
Coal-Soft	4.25	G.T.			
Cement	3.50	Bbl.			
Copper-Armature	27.35	Cwt.		.1000 lbs.	
Fence-Standard Wire	.67	Rod			
Ice for Cars	.80	Cwt.			
Insulators	1.57	Ea.			
Rails-Tie(20)					

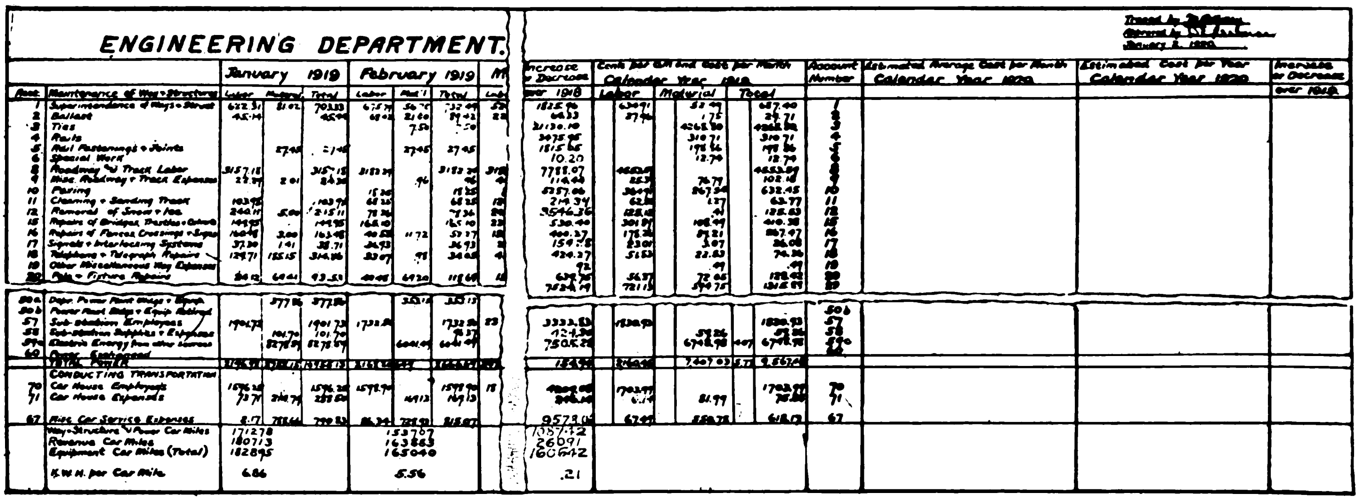


ROCHESTER & SYRACUSE RAILROAD COMPANY, Inc.

Estimate of Operating Expenses for Year 1919

WAY AND STRUCTURES

Account	Jan.	Feb.	Mch.	Nov.	Dec.	Acct.	Total	Average per Month
1 Supt. Way & Structures	703.33	732.40	639.18	625.00	625.00	1	7,700.00	641.67
2 Ballast	45.44	89.42	65.14			2	2,000.00	166.67
3 Ties		7.50				3	43,750.00	3,645.83
4 Rails						4	1,500.00	125.00
5 Rail Fastgs. & Joints	27.45	27.45				5	700.00	58.33
6 Special Work						6	300.00	25.00
8 Track & Rdway Expenses	3,157.18	3,182.29	3,160.00	3,160.00	3,160.00	8	54,800.00	4,566.67
9 Misc. Track & Rdway Expe.	24.30	.96	74.74	100.00	100.00	9	1,000.00	83.33
10 Paving		18.25	181.75			10	4,200.00	350.00
11 Cleaning & Sanding Trks.	103.98	68.25	77.77	83.33	83.34	11	1,000.00	83.33
12 Removal of Snow & Ice.	245.11	78.36	250.00	426.53	1,000.00	12	2,000.00	166.67
15 Bridges, Trestles, Culverts	149.95	165.10	584.96	300.00	300.00	15	7,100.00	591.67
16 Crossings, Fences & Signs	163.48	53.27	104.25	100.00	100.00	16	1,400.00	116.67
17 Signal & Interl. Appar.	38.71	36.93	46.86	42.00	42.00	17	500.00	41.67
18 Telep. & Teleg. Lines	314.86	34.05	16.09	15.00	15.00	18	500.00	41.67
19 Misc. Way Expenses						19		
20 Distri. Poles & Fixtures	93.53	118.68	77.79	170.00	100.00	20	1,750.00	145.83
22 Distribution System	1,190.04	314.88	895.08	1,000.00	1,100.00	22	13,300.00	1,108.33
23 Misc. Distrib. System			2.50	2.50	2.50	23	25.00	2.08
24 Bldgs. Fixtures & Grds.	629.61	149.26	298.13	325.00	325.00	24	3,900.00	325.00
25A Depre. Way & Strts.	1,133.59	1,059.39	1,172.39	1,215.45	1,274.95	25A	14,992.89	1,249.41
Total	7,920.56	6,135.53	7,644.12	7,864.81	18,227.79		162,417.89	13,534.83



ENGINEERING DEPARTMENT.

January 1919 — February 1919

Acct. — Maintenance of Way & Structures — Labor — Material — Total

1 Superintendence of Ways & Struct.
2 Ballast
3 Ties
4 Rails
5 Rail Fastenings & Joints
6 Special Work
8 Roadway & Track Labor
9 Misc. Roadway & Track Expenses
10 Paving
11 Cleaning & Sanding Track
12 Removal of Snow & Ice
15 Repairs of Bridges, Trestles & Culverts
16 Repairs of Fences, Crossings & Signs
17 Signals & Interlocking Systems
18 Telephone & Telegraph Repairs
19 Other Miscellaneous Way Expenses
20 Pole & Fixture Repairs
57 Sub-station Employees
58 Sub-station Supplies & Expenses
59 Electric Energy from other sources
CONDUCTING TRANSPORTATION
70 Car House Employees
71 Car House Expenses
67 Misc. Car Service Expenses

Way & Structure & Power Car Miles — 171278 — 153707
Revenue Car Miles — 180713 — 163863
Equipment Car Miles (Total) — 182895 — 165040
K.W.H. per Car Mile — 6.86 — 5.56

Increase or Decrease over 1918 — Costs per Month — Calendar Year 1919 — Labor — Material — Total — Account Number — Estimated Average Cost per Month Calendar Year 1920 — Estimated Cost per Year Calendar Year 1920 — Increase or Decrease over 1919

SOME OF THE FORMS USED IN COMPILING BUDGET DATA

Fig. 1 (Upper, left)—Materials price sheet furnished to department heads. Fig. 2 (Lower)—Chart used by department heads in forecasting expenditures. Fig. 3 (Upper, right)—Auditor's summary of estimates of operating expenses.

traffic agent, the superintendents and the chief engineer, all under the direction of the general manager, who acts as presiding officer. At a meeting of the cabinet each department head submits his trial budget of expense and describes in detail the method used in arriving at the proposed amount for each account. He then has to show proof why his estimated amount should be allowed to stand.

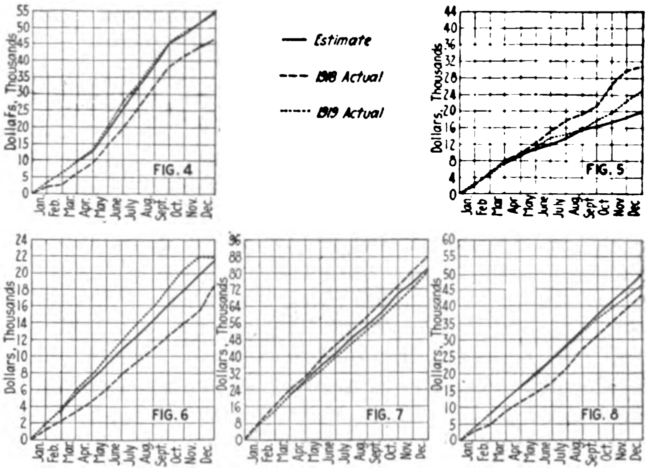
As the usual criticism of the cabinet is in the direction of downward revision of estimates it is obviously necessary that the department head be well fortified if he desires to have his estimates approved.

In the discussion of the proposed expenditures such items as wage contracts and their upward or downward revision, materials costs and the trend of the materials market, weather conditions, etc., are all brought into review. After a budget system has been in effect for several years much good material is available in the records to serve as ammunition for the cabinet to use in bombarding the head who is trying to get his estimate through, so that he is distinctly on the firing line while this procedure is going on.

After the cabinet has arrived at a tentative expense budget the earnings for the ensuing year are estimated. To some it may seem to be a waste of time to estimate future earnings, but it is a fact that in the last budget set up by this company the gross earnings were forecasted within 1 per cent of the actual. It is, in our opinion, just as necessary to set up a bogey for earnings of the traffic department as it is to fix one for the expenses of the mechanical, the way and the power departments.

Obviously, when the earnings as well as the expenses are estimated, it is possible to set up a proposed net income, which after all is the real goal in operation.

With us, after the trial budget has been accepted after revision by the cabinet, the department head turns over his estimate to the auditor, who assembles the budgets.

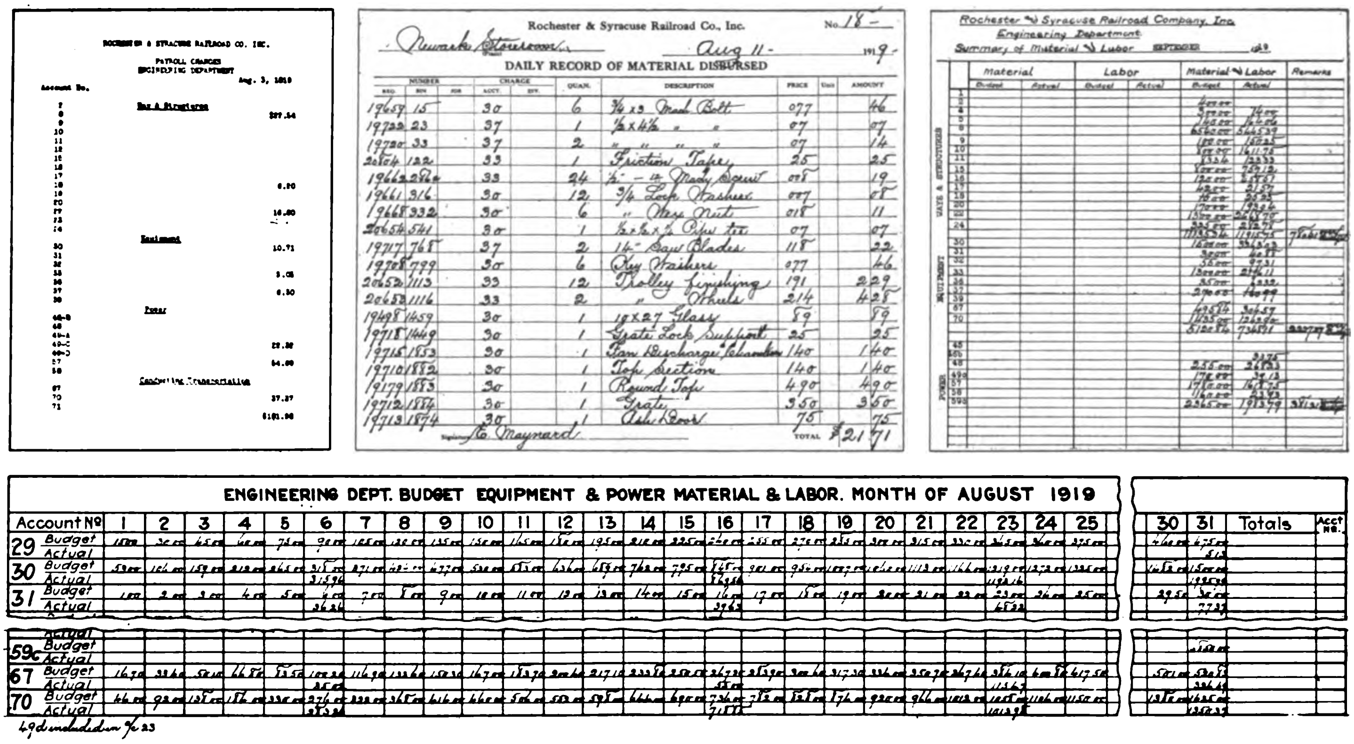


GRAPHICAL REPRESENTATION OF ESTIMATED AND ACTUAL EXPENDITURES BY ACCOUNTS

Fig. 4—Account No. 8, roadway and track labor.
Fig. 5—Account No. 33, electrical equipment of cars.
Fig. 6—Account No. 57, substation employees.
Fig. 7—Account No. 59C, electrical energy.
Fig. 8—Account No. 64B, passenger conductors.

The budget is spread over the year by months, as indicated in the form reproduced in part in Fig. 3. The estimates are put into graphic form, graphs being plotted for each expense item by account number and also for the earnings. Sample graphs are reproduced in Fig. 4 to 8 inclusive. The diagrams show the actual figures for the preceding year and the estimates for the current year. The actual expenditures for the current year are then plotted in as the year advances and serve as a splendid check on variations from the budget estimate.

The efficacy of a budget system depends, of course,



ROCHESTER & SYRACUSE RAILROAD CO. INC.

PAYROLL CHARGES
ENGINEERING DEPARTMENT

Aug. 3, 1919

Account No.

Way & Structures

Equipment

Power

Conducting Transportation

Rochester & Syracuse Railroad Co., Inc. No. 18 –

Newark Storeroom Aug 11 – 1919

DAILY RECORD OF MATERIAL DISBURSED

Number Req.	Bin	Job	Charge Acct.	Div.	Quan.	Description	Price	Unit	Amount
19657	15		30		6	3/4 x 3 Mach Bolt	077		46
19722	23		37		1	1/2 x 4 1/2 " "	07		07
19720	33		37		2	" " " "	07		14
20804	122		33		1	Friction Tape	25		25
19662	282		33		24	1/2 – 4 Mach Screw	008		19
19661	316		30		12	3/4 Lock Washer	007		08
19668	332		30		6	" Hex Nut	018		11
20654	541		30		1	1/2 x 1/2 x 1/2 Pipe tee	07		07
19717	768		37		2	14" Saw Blades	118		22
19708	799		30		6	Key Washers	077		46
20652	1113		33		12	Trolley Finishing	191		2 29
20652	1116		33		2	" Wheels	214		4 28
19498	1459		30		1	10 x 27 Glass	89		89
19718	1449		30		1	Grate Lock Support	25		25
19715	1853		30		1	Fan Discharge Chamber	1 40		1 40
19710	1882		30		1	Top Section	1 40		1 40
19179	1883		30		1	Round Top	4 90		4 90
19712	1884		30		1	Grate	3 50		3 50
19713	1874		30		1	Ash Door	75		75

E. Maynard TOTAL $21 71

Rochester & Syracuse Railroad Company, Inc.
Engineering Department
Summary of Material & Labor SEPTEMBER 1919

	Material Budget	Material Actual	Labor Budget	Labor Actual	Material & Labor Budget	Material & Labor Actual	Remarks

WAYS & STRUCTURES
EQUIPMENT
POWER

ENGINEERING DEPT. BUDGET EQUIPMENT & POWER MATERIAL & LABOR. MONTH OF AUGUST 1919

Account Nº		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	30	31	Totals	Acct Nº
29	Budget	15 00	30 00	45 00	60 00	75 00	90 00	105 00	120 00	135 00	150 00	165 00	180 00	195 00	210 00	225 00	240 00	255 00	270 00	285 00	300 00	315 00	330 00	345 00	360 00	375 00	[illegible]	475 00		
	Actual																											[illegible]		
30	Budget	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	Actual						[illegible]										[illegible]							[illegible]				[illegible]		
31	Budget	1 00	2 00	3 00	4 00	5 00	6 00	7 00	8 00	9 00	10 00	11 00	12 00	13 00	14 00	15 00	16 00	17 00	18 00	19 00	20 00	21 00	22 00	23 00	24 00	25 00	[illegible]	[illegible]		
	Actual						[illegible]										[illegible]							[illegible]				[illegible]		
	Actual																													
59c	Budget																											[illegible]		
	Actual																													
67	Budget	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	Actual						[illegible]										[illegible]							[illegible]				[illegible]		
70	Budget	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	Actual						[illegible]										[illegible]							[illegible]				[illegible]		

49d included in [illegible] 23

FAMILIAR RECORDS TO ROCHESTER & SYRACUSE DEPARTMENT HEADS

Fig. 9 (Upper, left)—Sample daily list of payroll charges furnished by auditor to the several departments.

Fig. 10 (Upper, middle) — Sample daily record of materials drawn from the storeroom.

Fig. 11 (Upper, right)—Sample summary sheet for daily comparison of expenditures with budget by account numbers.

Fig. 12 (Lower)—General summary sheet for engineering department for typical month.

on the follow-up system. My belief is that there should be a daily check of expense items. When such a check is provided it is possible to control the expense, whereas if a check is made only weekly or monthly it will usually be found that it is too late to adjust the account, the bulk of the money having already been spent. On our property department heads are furnished by the auditor with daily statements of labor expenditures charged to each account number, and also copies of disbursement sheets showing the consumption of material (see Figs. 9 and 10). From these data the labor and materials items are entered on forms like that reproduced in Fig. 11. This is done daily and the expenditures are checked against the budget. A monthly summary, such as that illustrated in Fig. 12, is made up from these sheets.

In our case the department heads meet every two weeks at the general manager's office and review the budget. Hence the system serves not only to permit checking against the budget, but it forces the engineering and mechanical departments to keep themselves constantly advised of the expenditures which they are making, and as to the relation of these expenditures to the other expenditures on the property. The technical departments are mentioned specifically because their expenditures are subject to the greatest variations and control and therefore are most readily amenable to the budget system. Our plan also produces very close co-operation among the department heads as a whole, and the good-natured discussion of proposed expenditures tend to maintain a fine *esprit de corps* in the organization as a whole.

Reliability of the Automatic Substation

Experience of New York State Railways with Automatic Substation Demonstrates Dependability of Automatic Control with Reasonable Care in Inspection and Maintenance—Latest Operating Data Are Given

FOR more than two years the New York State Railways has had in operation an automatic substation on the Rochester & Sodus Bay line at Williamson, which is about 30 miles from Rochester. Details of the construction and operation of this substation were given in a paper by C. L. Cadle before the New York Electric Railway Association, abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 20, 1919. The New York State Railways has furnished some recent data as to the operation of the Williamson substation, as follows:

The cost of this substation, one of 250-kw. capacity, which was commissioned in February, 1919, was slightly more than $17,000, of which about one-third was for land and buildings, the remainder being for substation equipment and installation, including supervision. The annual cost of operation is $3,263, which is nearly $5,000 less than would be required for manual operation. The annual cost includes 10 per cent depreciation and fixed charges for land and buildings, $598; 15 per cent for depreciation and fixed charges on machinery, $1,219; actual repairs to equipment, $827; inspection and maintenance, $619. A reactance coil costing $535 was also installed during 1920, which belongs, of course, in the capital account.

During the past year interruptions to service caused by automatic equipment covered 207½ hours, and those due to other causes totaled 137½ hours, a total of 345 hours. The interruptions due to the equipment are subdivided roughly as follows: Re'ay failures, eight in number, average duration of interruptions, eight hours and five minutes; interlock failures, two interruptions, eleven hours and fifteen minutes; direct-current resistor failures, one interruption, forty-three hours and forty-five minutes; speed-limit-device failures, two interruptions, averaging each fifty-two hours and twenty minutes. External interruptions were due to line trouble, falling of trolley wires, failure of alternating-current power, failure of remote-control apparatus and failure of train dispatcher to cut in remote control.

The inspections given the automatic substation comprise a casual daily "once-over" and a thorough weekly inspection. An employee of the company who lives near by changes record charts and spends a total of one and one-half hours in this duty and in watching the operation, looking, of course, at all parts of the equipment. A "relief operator" spends one day each week in making a thorough inspection, tidying up the substation and filling in the record forms.

As the relief man goes over the apparatus, part by part, he fills in blank spaces on a question form which covers all details of equipment. For example, on the oil switch are these questions: Are all fulcrum pins and cotter pins placed and in good condition? Are all nuts and screws set tight? As to the oil switch mechanism, these are some of the questions: Are all nuts, setscrews and springs tight and in good condition? Are all electrical contacts tight? Are all contacts and fingers clean and in good condition? Is operation satisfactory? In all, a total of about seventy-five questions are asked.

A weekly report on interruptions is also made on an appropriate form, giving, with respect to each interruption, the date, the times of the beginning and ending of each interruption period, the duration and the cause. Space is allowed on the form for explanation, etc.

Special Library Co-operation in Boston

THE special libraries maintained by the Boston (Mass.) Elevated Railway and Stone & Webster have united with those of nine other companies in Boston representing various fields of industry, business and research in the publication of a "Union List of Periodicals and Annuals" taken by the several members of the agreement. This list comprises 750 individual publications, some of which, being extremely specialized or little known outside of particular industries, are often hard to find when wanted for immediate reference. Included, also, are all the well-known technical and trade papers, and the published proceedings of various technical, research and business organizations. The list is sold for a nominal price, which covers the cost of printing only.

By means of this list, and other co-operative measures which they employ, the librarians, or information experts as they really are, are able to secure from each other, by telephone or messenger service, the very latest published information on an extremely wide range of subjects which may be called for at any moment by the business executives whom they serve.

Lewis A. Armistead and George Winthrop Lee, special librarians respectively of the Boston Elevated Railway and Stone & Webster, were largely instrumental in the compilation and publication of the "Union List of Periodicals and Annuals."

The Automatic Substation in Electrolysis Mitigation

Results of Special Investigation Made for Scientific Purposes at Des Moines, Iowa, by the Bureau of Standards Confirm Theoretical Conclusion that Increase in Number of Feeding Points Made Possible by Automatic Control Acts to Reduce Track Gradients and Potentials

BY E. R. SHEPARD
Electrical Engineer United States Bureau of Standards, Washington, D. C.

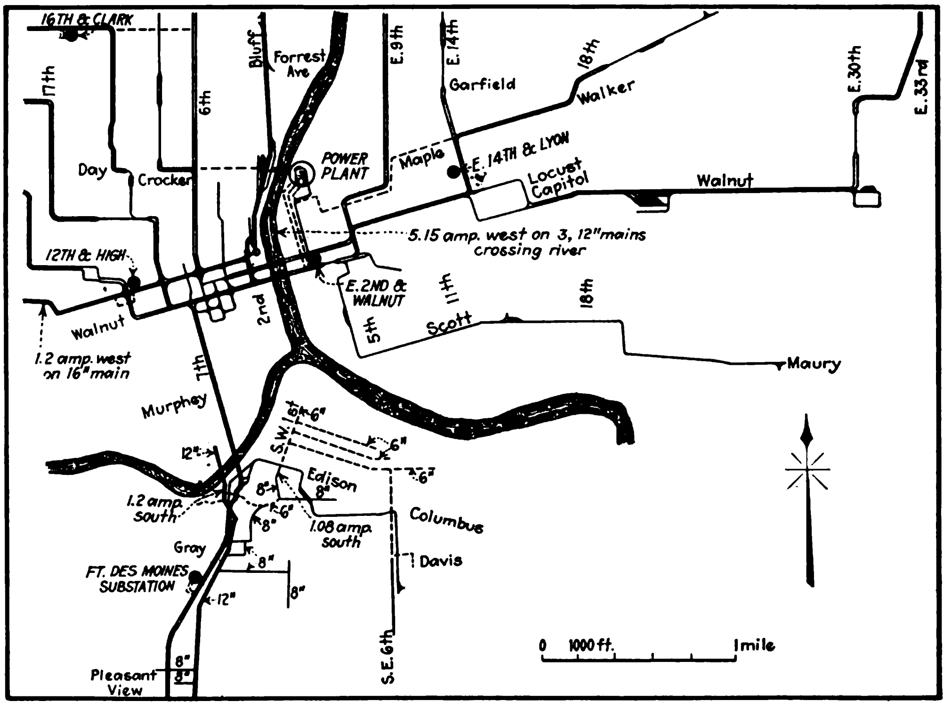


PLATE 1—CHART SHOWING CURRENT FLOW IN WATER MAINS

AMONG the various methods of electrolysis mitigation which have been proposed and used, the use of multiple-feeding points for railway current is considered of primary importance. The practical limit in the number of feeding points is usually set by operating costs, but with the advent of automatic control for railway substations the number of feeding points which can be economically employed has considerably increased. While automatic substations are being installed by railway companies primarily for economic reasons, improved electrolysis conditions will generally follow their installation.

The Des Moines (Iowa) City Railway recently brought to a practical completion a system of automatic substations which is the most extensive for strictly urban use in the country. The engineers of the Bureau of Standards therefore considered that a thorough study of the Des Moines system, with particular reference to the electrolysis situation, would be of technical and scientific value and interest.

The Des Moines City Railway and other public utility companies in the city of Des Moines were informally consulted regarding this matter in the spring of 1919 and all agreed to co-operate in a general study of the situation. An investigation, started in September of that year, was carried out under the direction of an engineer of the United States Bureau of Standards. This was made possible through the hearty co-operation of F. C. Chambers and K. J. Keith of the railway company, H. V. Smith and G. Ireland of the Iowa Telephone Company, A. T. Luce of the Des Moines Water Company, H. R. Sterrett of the Des Moines Gas Company, J. M. Pilmer of the Des Moines Electric Company and F. R. Porter of the Western Union Telegraph Company. The necessary technical and field help was furnished by the first-mentioned three companies.

Practically no data are available showing electrolysis conditions prior to the installation of the automatic substations. From all accounts, however, very high over-all potentials existed on the track system as well as high potential differences between tracks and pipes. Measurements previously made were understood to reveal current flow on water main and potential differences which would ordinarily be considered very bad, but an examination of the pipes had shown practically no corrosion. The latter circumstance was attributed to the high resistivity of the soil in the city. The water pipes were electrically drained to the tracks by the negative bus at the power house, and it is said that very heavy currents were carried. The telephone cables were drained to the negative return feeders at several points.

Prior to the present installation of automatic substations, the Des Moines City Railway was supplied from a single feeding point at East Second and Maple Streets, involving feeding distances of 3 miles or more. Now there are six automatic substations in the city and two automatic and one manually operated substations on near-by interurban lines. Each city substation contains one 500-kw. rotary converter. With the exception of the Fair Ground line at East Walnut Street there is no feeding distance more than about 7,000 ft. With the 85 miles of single track operated by the company, including the interurban line, the mileage of track per substation is under ten.

In addition to the substations there is a rotary converter at the power house on East Second and Maple Streets, which carries the night load after the substations have shut down.

The substations at Twelfth and High Streets and at East Second and Walnut Streets operate only during the peak loads, while the other substations operate approximately nineteen hours per day. The operating voltage at the outlying stations is 650, that at the Sixteenth and Clark Streets and at East Fourteenth and Walker Streets substations is 625, while the peak load substations operate at 600 volts. This voltage adjustment is based on peak-load conditions and enables all six substations to carry their proper portions of the load during the peak. As the load drops off, the stations operating at the lower voltages are the first to shut down. In order to prevent the two peak-load stations from coming on and off unnecessarily, the switches in the high-voltage lines which supply them are closed only after the traffic becomes sufficiently great to enable the stations to stay in under the fluctuating load. The load curves of the several stations are shown on page 808, Figs. 2 to 7, and the total system load in Fig. 8. These were determined for a typical day from measurements made on the high-voltage lines, with corrections for transmission and conversion losses. They are only approximately correct.

In the tests, track gradient and over-all potential measurements were made by the aid of about fifty pilot wires loaned by the Iowa Telephone Company. These wires were connected to the tracks at the points indicated in Plate 2. They terminated in the telephone company's exchange on binding posts installed on a map of the railway system, at points corresponding to the actual field locations. The results of the measurements are graphically shown on Plate 2.

The average values of the over-all voltages are practically all under 10 volts. Some unusually high values were observed for short periods, but these conditions were admittedly due to poor bonding. A high gradient was observed on University Avenue, between Thirty-fourth Street and Forty-sixth Street, where the negative feeder from the Polk Boulevard substation connects with the track. This was undoubtedly caused by bad track conditions.

The highest gradient observed in the city was that on the Fort Des Moines line between the substation and the Raccoon River, a distance of about 3,000 ft. Here the gradient was about two volts per 1,000 ft., due not to poor track conditions but to the very heavy load carried by this substation. The tracks adjacent to the Sixteenth and Clark Streets substation are also heavily loaded, the gradients being 1.4 and 1.8 volts per 1,000 ft. However, as the distances over which these heavy gradients exist are comparatively short, the electrolysis conditions are by no means as serious as those surrounding the Fort Des Moines substation. In all other sections the gradients are comparatively low and within limits usually considered satisfactory.

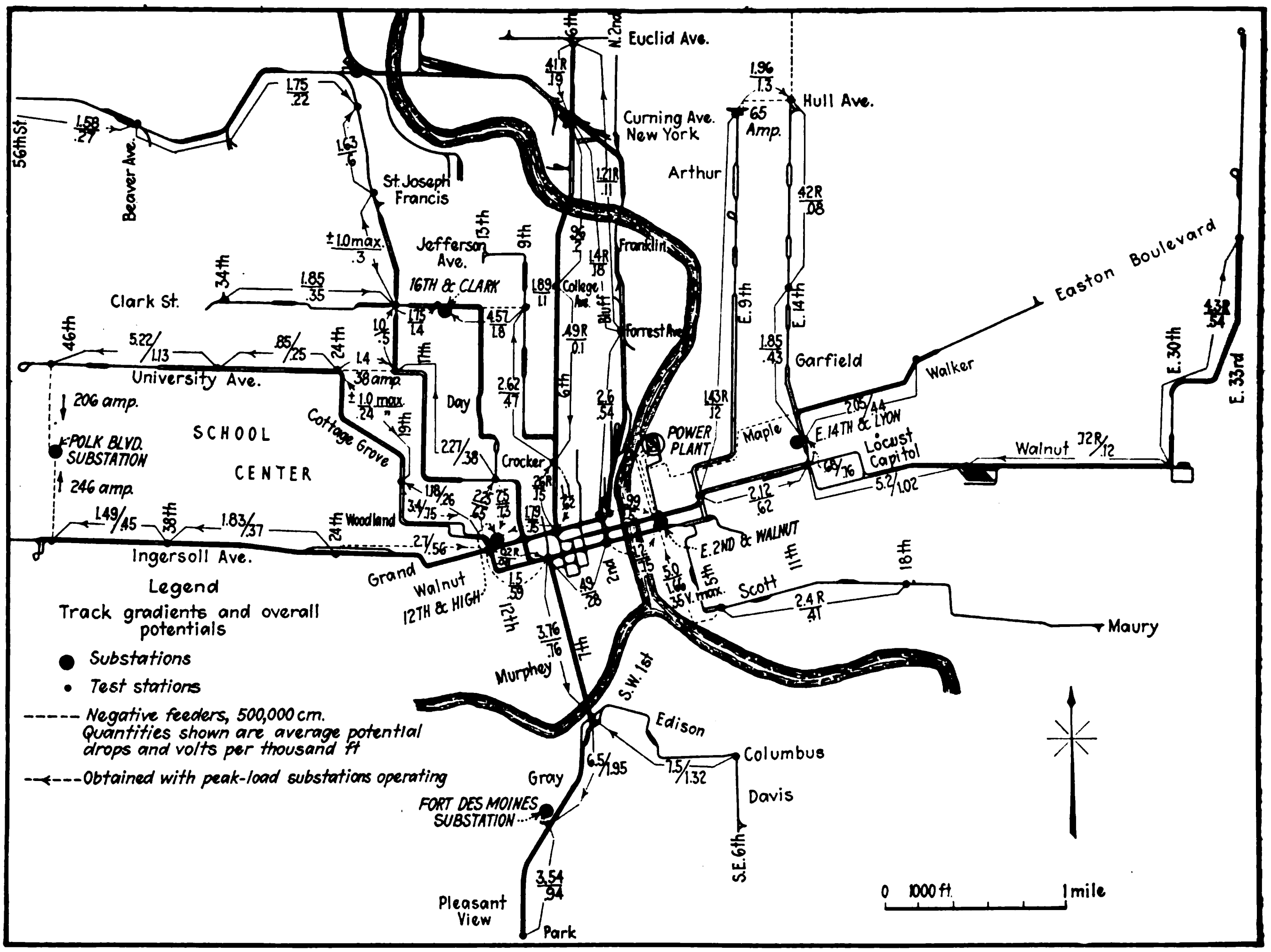

Euclid Ave.
Hull Ave.
Cuming Ave.
New York
Arthur
St. Joseph
Francis
Jefferson Ave.
16TH & CLARK
Clark St.
University Ave.
206 amp.
POLK BLVD. SUBSTATION
246 amp.
SCHOOL CENTER
Cottage Grove
Woodland
Ingersoll Ave.
Grand
Walnut
12TH & HIGH
Day
Crocker
College Ave.
Franklin
Forest Ave.
POWER PLANT
Maple
Garfield
E. 14TH & LYON
Walker
Easton Boulevard
Locust
Capitol
Walnut
E. 2ND & WALNUT
Scott
Maury
Murphey
S.W. 1st
Edison
Columbus
Davis
Gray
FORT DES MOINES SUBSTATION
Pleasant View
Park
S.E. 6th
56th St.
Beaver Ave.
46th
34th
E. 9th
E. 14th
E. 30th
E. 33rd
0 1000 ft. 1 mile
65 Amp.
38 amp.
Legend
Track gradients and overall potentials
● Substations
• Test stations
----- Negative feeders, 500,000 cm.
Quantities shown are average potential drops and volts per thousand ft
--<---Obtained with peak-load substations operating

PLATE 2—RESULTS OF SURVEY OF TRACK POTENTIALS AND GRADIENTS

POTENTIAL DIFFERENCE MEASUREMENTS

Potential difference measurements between water hydrants and tracks were made in about seventy-five locations, half-hour records being obtained with recording instruments. The results are shown in Plate 3. In the downtown districts measurements were made with and without the peak-load substations operating and both measurements are recorded on Plate 3.

The effect of the poor track on University Avenue is seen in the positive value of 2 volts as compared with 0.24 volt on Ingersoll Avenue. This condition can undoubtedly be greatly improved by repairing all defective bonds on University Avenue.

On the Fort Des Moines line average potential differences between pipes and track as high as 7 volts were observed. There are several factors which mitigate this apparently bad condition, which will be referred to later. In the Sixteenth and Clark Streets substation district the maximum positive voltage observed was 1.6 volts and in the East Fourteenth and Walker Streets district the maximum positive value was 0.96 volt. In the downtown district a generally negative condition on the pipes prevails when the peak-load stations are not operating, and a positive condition of about 0.25 volt prevails during the period when they are operating. Potential difference measurements between various cable systems and other structures were made in a number of locations. As the drainage of the telephone cables had not been adjusted to the present railway distributing system, they were found to be positive to the earth in all substation districts. It is only during recent months that the substation installation has been completed and put in normal operation.

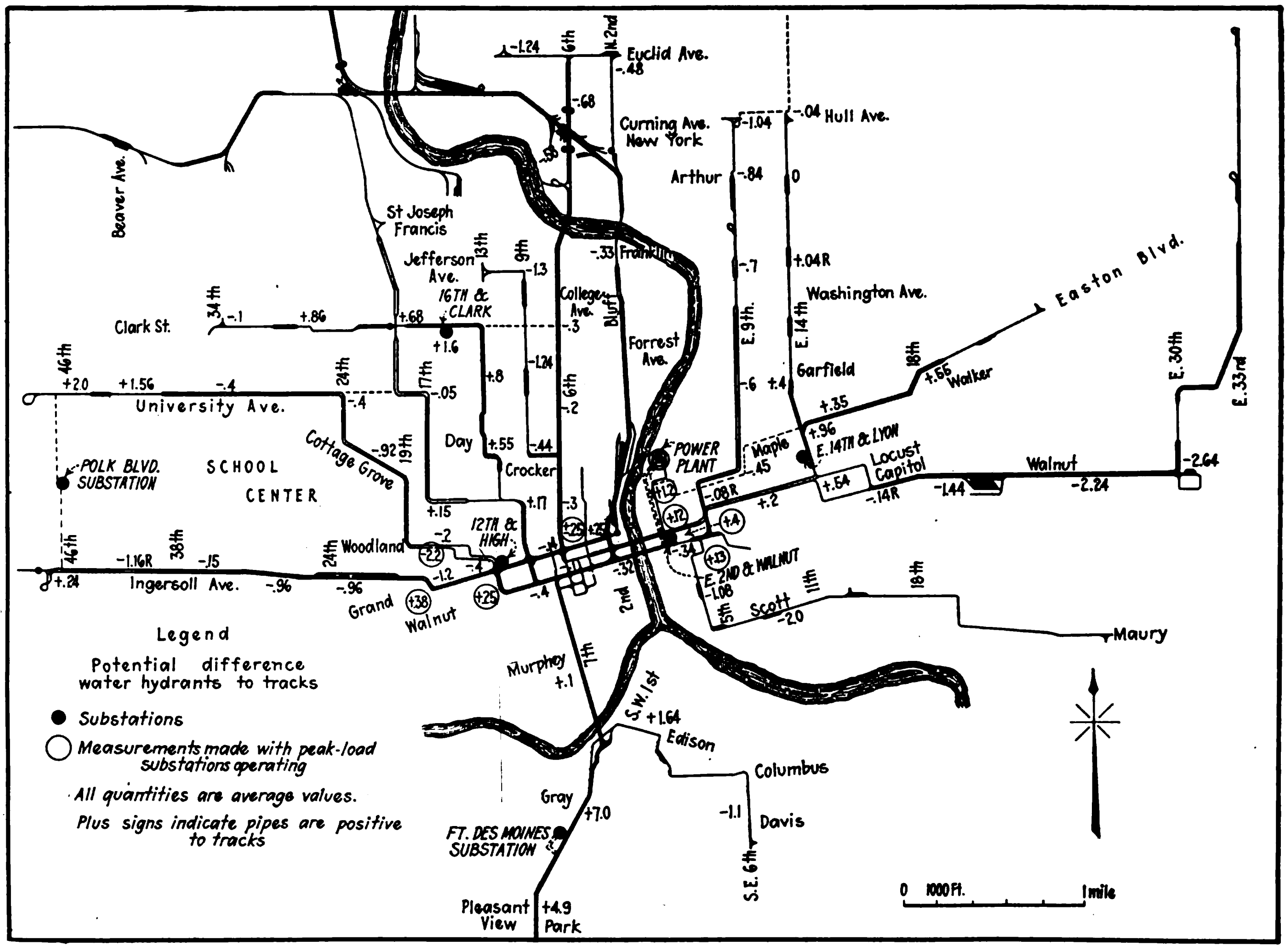

Beaver Ave.
St Joseph
Francis
Jefferson Ave.
13th
9th
-1.3
16TH & CLARK
Clark St.
34th
-.1
+.86
+.68
+1.6
-.3
46th
+2.0
+1.56
-.4
University Ave.
24th
-.4
17th
-.05
+.8
-1.24
6th
-.2
Day
+.55
-.44
Crocker
Cottage Grove
-.92
19th
POLK BLVD. SUBSTATION
SCHOOL CENTER
+.15
+.17
-.3
12TH & HIGH
-2
-22
Woodland
46th
38th
-1.16R
-.15
+.24
Ingersoll Ave.
-.96
-.96
-1.2
-.4
Grand
+38
+25
Walnut
-.4
-.32
2nd
+25
+25
-1.24
6th
N. 2nd
Euclid Ave.
-.48
-.68
Curning Ave.
New York
-1.04
-.04 Hull Ave.
Arthur
-.84
0
-.33
Franklin
College Ave.
Bluff
Forrest Ave.
-.7
+.04R
Washington Ave.
E. 9th.
E. 14th
Easton Blvd.
Garfield
-.6
+.4
18th
+.56
Walker
+.35
E. 30th
E. 33rd
POWER PLANT
Maple
-.45
+.96
E. 14TH & LYON
Locust
Capitol
+.54
-.14R
-1.44
Walnut
-2.24
-2.64
+1.2
-.08R
+.2
+12
+.4
-.34
+13
E. 2ND & WALNUT
-1.08
5th
Scott
-2.0
11th
18th
Maury
Legend
Potential difference water hydrants to tracks
● Substations
○ Measurements made with peak-load substations operating
All quantities are average values.
Plus signs indicate pipes are positive to tracks
Murphey
+.1
7th
S.W. 1st
+1.64
Edison
Columbus
-1.1
Davis
S.E. 6th
Gray
+7.0
FT. DES MOINES SUBSTATION
Pleasant View
+4.9
Park
0 1000 Ft. 1 mile

PLATE 3—RESULTS OF POTENTIAL DIFFERENCE MEASUREMENTS BETWEEN WATER HYDRANTS AND TRACKS WITH AND WITHOUT PEAK-LOAD SUBSTATIONS OPERATING

It was generally agreed in the discussion of this subject that the cables should be drained at all substations, but only during such periods as the substations operate. Such an arrangement will require the installation of an automatic switch, at each substation, which will be actuated from the terminals of the rotary converters, so as automatically to connect the drainage cables to the negative busbar during the period of operation. The railway company will install such switches.

It is presumed that the railway will extend a common drainage cable from each such switch to some point convenient for all cable-owning companies to connect to it. It is proposed that the telephone company should install a No. 0000 copper drainage wire in each substation district, employing aërial sheaths when necessary to reach the underground plant. Measurements will be made by other cable-owning companies to determine whether their cable system needs drainage.

CURRENT FLOW IN WATER MAINS

Measurements of current flow in water mains were made in six locations, the more important of which are shown in Plate 1. All of these currents were small, the largest being 5.15 amp. on three parallel 12-in. cast-iron mains which crossed the Des Moines River on Locust Street.

The highly positive piping system south of the Raccoon River, shown in Plate 1, is supplied by only two water mains from the north, one a 12-in. cast-iron main crossing the Raccoon River at southwest Ninth Street and the other an 8-in. main on southwest First Street. These pipes were found to be carrying 1.2 amp. and 1.08 amp. respectively. As the railway load from the south is comparatively small, and as the distribution water system is not extensive, it is not likely that any appreciable current is carried into this positive area over the main from the south.

Five soil samples were collected by Mr. Sterrett of the gas company from open trenches in the downtown district and were tested for resistivity. These had an average resistivity of 3,100 ohms for 1 cu.cm. as received, and 1,800 ohms when the samples were saturated with moisture. The latter figure is about three times that for the resistivity of New Orleans soil and about twice that for the soil in the downtown district in St. Louis, but considerably lower than that for Washington and Philadelphia soils. The earth south of the Raccoon River along the Fort Des Moines lines is undoubtedly of a much higher resistivity than the samples tested.

It is apparent from the results of the tests that electrolysis conditions in general have been greatly improved by the installation of the several substations. With one or possibly two exceptions track gradients and over-all track potentials will be reduced to satisfactory values when all the tracks are properly bonded.

The one location where gradients appear to be excessive is south of the Racoon River along Fort Des Moines line. Considering the small amount of current entering the piping system adjacent to the Fort Des Moines station, caused probably by the relatively high resistance of the earth in this locality, the high potential differences observed are not to be taken as a measure of the hazard involved. However, as the current discharged may be largely concentrated at the few points where mains cross under the tracks, it seems desirable to reduce the potential difference between the pipes and the tracks in this area. This could be done either by the use of a 1,000,000-circ.mil insulated negative feeder from the Fort Des Moines substation to the junction point on the tracks south of the Raccoon River, or by a moderate amount of pipe drainage under proper control and supervision.

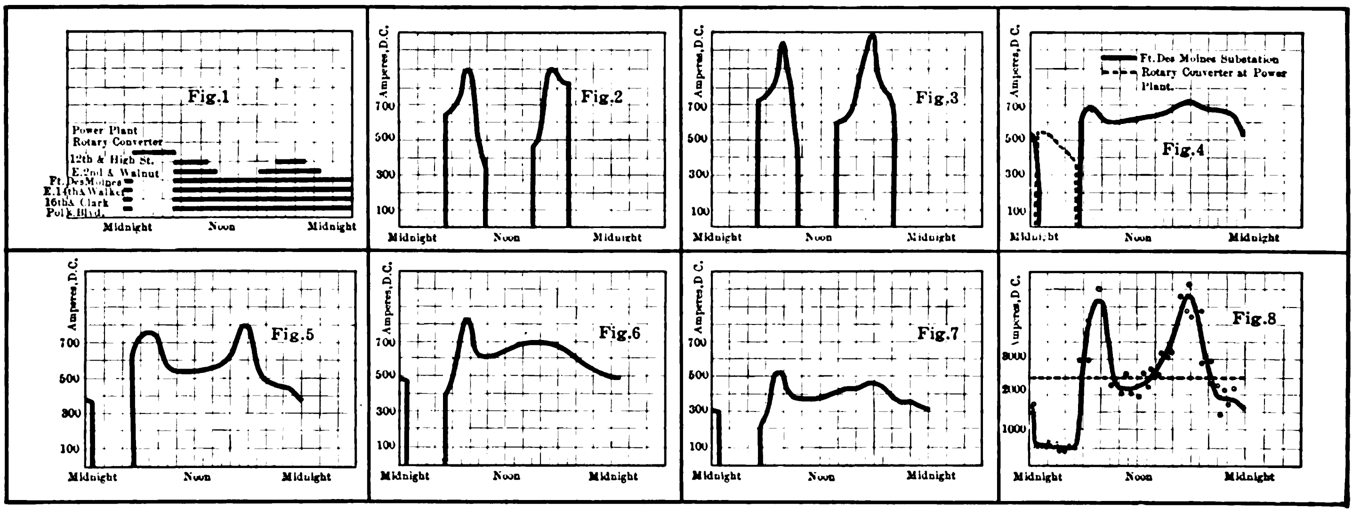
If the first plan were used, the feeder would be 3,000 ft. long, and a resistance would be inserted between the negative bus and the adjacent track to give a potential drop of 10 volts between the track and the negative bus. This would involve an investment cost of $2,400 and an annual cost of $590 for power at one cent per kilowatt-hour.

A similar calculation was made for reducing the potentials in the vicinity of the Sixteenth and Clark Streets substation, although the need of improvement there is not as great as in the other case. Here a 500,000-circ.mil cable 4,000 ft. long with the necessary resistance taps would cost about $1,650 and the annual power cost would be $235.

The pipe drainage would be less expensive, but if this plan is to be employed in the district south of the Raccoon River, a preliminary test is suggested to see if the potential of the pipe can be lowered to proper values without excessive drainage current and to determine if practicable whether any objectionably high resistance joints exist in the 12-in. water main on southwest Ninth Street.

In conclusion it may be said that as a general policy it is very desirable that voltage measurements and inspections should be made from time to time on all cable and piping systems, as changing load conditions and the failure of rail bonds and drainage bonds are more than likely to establish bad local electrolysis conditions.

The importance of track maintenance cannot be too strongly emphasized. This is the prime requisite for good electrolysis conditions and without it no system of mitigation is entirely effective in protecting underground structures.



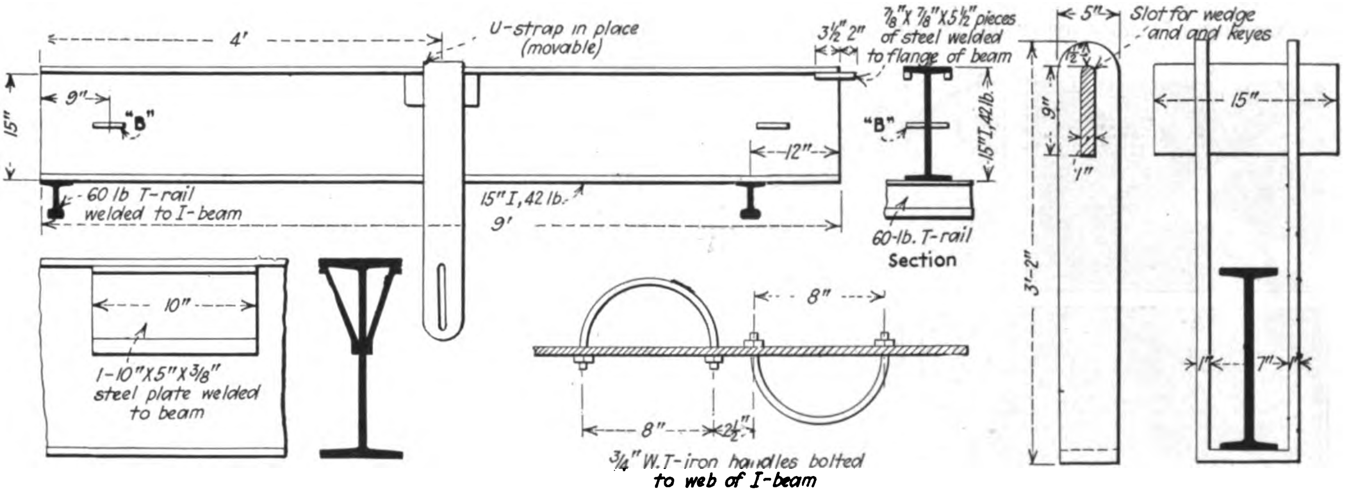
CHARACTERISTICS OF RAILWAY POWER LOAD AT DES MOINES, IOWA

Fig. 1—Normal periods of operation of automatic substations.
Fig. 2—Station load curve, Twelfth and High Streets.
Fig. 3—Station load curve, East Second and Walnut Streets.
Fig. 4—Station load curve, Fort Des Moines substation and rotary converter at power plant.
Fig. 5—Load curve of converter substation at East Fourteenth and Walker Streets.
Fig. 6—Station load curve, Sixteenth and Clark Streets.
Fig. 7—Station load curve, Polk Boulevard.
Fig. 8—Total railway load.

The American Society of Civil Engineers at its 1921 annual meeting accepted the offer of *Engineering News-Record* to establish an "Arthur M. Wellington Prize" to be awarded annually for the best paper presented before the society on any phase of the science and art of transportation. The prize is a memorial in honor of a former editor of *Engineering News* and the author of the well-known book entitled "The Economic Theory of Railway Location."

Rehabilitating Track in Massachusetts

Welding in Various Ways Is Used on a Large Scale—During 1920 the Sum of $1,600,000 Was Spent on Trackwork—Vertical Rail Benders Have Been Perfected—Lighter Track Considered Possible Owing to Extensive Use of One-Man Cars


4'
U-strap in place (movable)
3½" 2"
⅞"X ⅞"X5½" pieces of steel welded to flange of beam
15"
9"
"B"
12"
60 lb T-rail welded to I-beam
15" I, 42 lb.
9'
"B"
15" I, 42 lb.
60-lb. T-rail Section
10"
1-10"X5"X⅜" steel plate welded to beam
8"
8"
2½"
¾" W.T-iron handles bolted to web of I-beam
5"
Slot for wedge and and keyes
½"
9"
1"
3'-2"
15"
1"
7"
1"

Detail of Steel Plate Reinforcement **Detail "B"** **Detail of U-Strap**

VERTICAL RAIL BENDER FOR HEAVY RAILS. THE COMPANY USES A LIGHTER TYPE FOR RAILS UP TO 75 LB. PER YARD

WELDING will be used extensively for joint maintenance on the property of the Eastern Massachusetts Street Railway during 1921. An extended account of the track maintenance methods followed during 1919 and 1920 on this property was given in a paper presented at a meeting of the New England Street Railway Club on Dec. 2 by Frank B. Walker, engineer maintenance-of-way of the company. This paper was published in abstract on page 1237 of the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 18, 1920, but further particulars will be of interest. A table showing the work done during the past two years is given below:

TRACKWORK DONE 1919–1920

	1919	1920	Total
Track relaid (feet)	63,560	155,121	218,681
Track overhauled (feet)	*423,520	*472,469	*895,998
Ties installed	98,273	105,252	203,525
Joints Lorain welded	2,333	6,978	9,311
Joints Lincoln welded	306	6,590	6,896
Joints thermit welded	112	1,658	1,770
Joints having new angle bars	No report	1,348	1,348
Joints having surface bends removed	None	10,777	10,777
Joints surface welded	No report	11,475	11,475
Joints bonded	12,771	21,311	34,082
Pieces special work put in	129	479	608

*This figure is larger than it otherwise would be owing to the fact that during part of the time covered some of the reports covered track on which minor repairs only were made.

The cost of the work done during seven months of 1919 was $760,000 and during the active year of 1920 was $1,600,000. This latter sum amounts to $2,353 per mile of track.

WELDING JOINTS

The program of the company for 1921 provides for the welding of from 20,000 to 30,000 joints. As in 1920, thermit welding will be used on all new 9-in. and 7-in. girder rails and arc welding on 9-in. and on 60-lb., 70-lb. and 75-lb. T-rails where the lines are to be overhauled and the joints are not beyond the repairing stage. Arc welding will also be used on new and relaying 60-lb. and 75-lb. T-rails. This means that much arc welding will be employed.

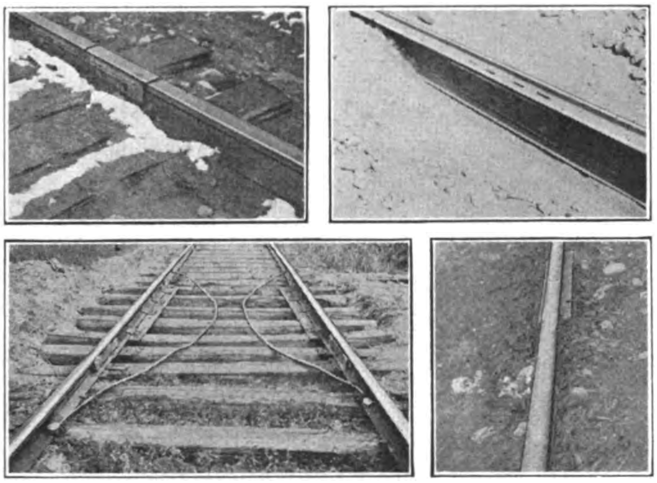
Where old track is being rehabilitated and the angle plates are badly worn the process followed is to put on new plates, if any are available, many sections being obsolete, or to put the old plates on upside down. The bolts are then tightened and if the point is low the ends of the rails are bent up about ¼ in. to ½ in. above the level. The bolts are then again tightened and the plates are then seam-welded in position. If the angle plates have been reversed the flange of the one on the inside of the track is then cut off with a torch. No effort is made to cut off the flange on the outside of the track. With a 9-in. girder rail, where it is difficult to get at the top of the plate underneath the tram of the rail, slots are cut in the tram with an acetylene torch to provide access to the top of the plate for welding. An accompanying photograph shows a 75-lb. T-rail with reverse angle plate welded, one side cut off and the other side not cut off. A second photograph shows a 9-in. girder rail with the slots mentioned cut in the tram.

Up to the present the company has been doing its arc welding with a carbon pencil with the rail as the positive pole, the theory being that no carbon can be drawn into the rail by the passage of the current. The company will experiment this year with a metallic pencil and with welds made in a variety of ways to determine which is best.

Practically all joints are now made by welding, even joints in exposed track. Where the track is entirely exposed expansion joints are put at the end of each curve and every 750 ft. on tangents. It is not expected, however, that these joints will relieve all stresses and strains in the track, as the extent to which the rails will slide over the ties and adjust themselves to expansion and contraction depends upon many causes, including the extent of corrosion between the spikehead and the base of the rail. About 4 miles of open track was welded by the Lorain process last year, and during the winter the breakages did not exceed 2 per cent. These breaks always occurred at the end of the angle or welding bar. An essential feature of the success of track welding consists in having the parts sand blasted or otherwise thoroughly cleaned just before welding. After the welding is done the joint is smoothed down by a grinder.

RAIL BENDERS

A brief description was given in the paper of Mr. Walker before the New England Street Railway Club on Dec. 2 of the home-made vertical rail benders used on the property. There are two types of these benders: One for 9-in. rail is made up of a 15-in. I-beam and one for T-rails up to 75 lb. made up of a 9-in. girder rail. A drawing of the former is shown. The bender of lighter design is very similar to the other except that it is made up of an old piece of 9-in. rail instead of a 15-in. I-beam. The drawing shows a yoke to go over the top of the bender and under the rail joint, though a chain for this purpose is sometimes used, as in the photograph accompanying Mr. Walker's paper in the issue of Dec. 2, 1920. The yokes are considered better, but trackmen sometimes mislay them and will then use anything handy, as a chain. The jacks used with these benders where a 9-in. 104-lb. girder rail is to be bent are of 30 tons capacity. For lighter rails jacks of less capacity are used.



REPAIRING TRACK IN MASSACHUSETTS

Typical break in arc-welded joint. Slots in tram head of 9-in. girder rail to facilitate joint welding. Expansion joint used with Lorain-welded joints on exposed track. Seam-welded plates reversed on 75-lb. rail.

The operation requires two men and the time taken is about ten minutes from the time that the jack and the bender are moved from one joint to the time they are ready to move to another. The general procedure is about as follows:

The ballast at the joint to be bent is opened up, after which any badly worn plates or bolts are replaced, then the bolts are pulled up tight. The yoke is then placed around the bottom of the plate at the center of the joint and the joint is raised from ¼ in. to ½ in. higher than the general rail surface, the height depending on the sag of the old bend at the joint. Before the jack is released the joint and adjacent ties are tamped.

With the length of bender illustrated it was found that the bending took place not only between the two bender supports but that the rail for several feet away from the bender support was raised. This was considered satisfactory as the deflection is usually 5 or 6 ft. back in each direction from the joint, although the extent of this deflection is not always apparent. Where the bend to be removed is very short an especially short bender is used. It was found also that the splice bars were bent up as well as the rails. Sometimes after these rebent joints had been under service for several days they sagged back, but in that case they were again set up.

Trackmen were instructed to see that the jacks had a firm position, because if they slipped out during the bending process the kick-back would be liable to hurt the men. The Eastern Massachusetts Company has had no injuries from this cause, but other roads have. The use of this rail bender ahead of the Lorain welder on badly surface bent 9-in. girder and light T-rail has also been found to help materially.

The rehabilitation work of the company during the past two years is based on the extended use on the system of one-man cars. In fact, the company is working rapidly toward 100 per cent one-man operation, and it is believed that a lighter track is possible than would otherwise be required. The abandonment by the company last year of freight service helps to make a light track adequate for the service operated.

Changes in Retail Prices of Food in the United States

THE retail food index issued by the United States Department of Labor through the Bureau of Labor Statistics shows that there was a decline of 1 per cent in the retail cost of food to the average family in March as compared with February.

Prices of forty-three food articles are reported to the Bureau of Labor Statistics each month by retail dealers in fifty-one important cities. From these prices average prices are made for each article. These average prices are then weighted according to the quantity of each article consumed in the average workingman's family. From January, 1913, to December, 1920, twenty-two articles of food were used in this index, but from January, 1921, forty-three articles are included in the index number.

For the year period March 15, 1920, to March 15, 1921, the percentage decrease in all articles of food combined was 22 per cent. For the eight-year period, March 15, 1913, to March 15, 1921, the percentage increase in all articles of food, combined, was 61 per cent.

The weighted index number of wholesale prices compiled by the department through the Bureau of Labor Statistics, and in computing which due allowance is made for the relative importance of the different commodities, stands at 162 for March, compared with 167 for February and 177 for January of the present year. The March figure is 36 per cent below that of March, 1920, and over 40 per cent below the high peak of last May. The base used in computing these index numbers is the average for the calendar year 1913.

New York Transit Reviewed*

The City Securities Which Were Issued for the Original Subway Are Shown to Have Been Self-Supporting Until Contracts for the New Lines Were Signed—Later Franchises Are Discussed — The Services of the New Commission Should Be Very Helpful

BY HERMAN A. METZ
Former Comptroller City of New York

IN CONSIDERING the rapid transit question we have to go back to certain fundamentals and understand just what the city can do and cannot do in regard to its transportation question. I believe in home rule as much as any one, but sometimes the home rule principle falls down. The whole history of rapid transit legislation shows that the home rule principle was never considered to any great extent.

Under the original rapid transit act the Legislature created a commission consisting of seven members, five of them former presidents of the Chamber of Commerce of the State of New York, with the Mayor or Comptroller ex-officio members. This body was self-perpetuating. As vacancies occurred, other past-presidents of the Chamber of Commerce were nominated for membership. The city authorities; that is to say, the Board of Estimate, had the power to approve the routes laid out by this commission, pay them the salaries and vote the money for the building of the roads.

This was the commission that laid out the first subway, and after it had been authorized none of the people then interested in railroads in New York would even touch it. It remained for August Belmont to take a chance and equip and operate it under Contract No. 1, which specified that the operating company was to pay the interest and sinking fund on the city's investment of about $45,000,000, so that in reality this subway did not cost the city one cent and the bonds became self-sustaining the moment they were issued.

The contract turned out to be a good one for Mr. Belmont's company, and of course, as usual, agitators began to decry the profits the company was making and demand the abrogation of the contract and do all kinds of things to take it away from the Interborough. If it had been the other way and the Interborough had lost money, no doubt the same people would have chuckled with glee at the prospect of a corporation getting "stuck."

The old commission, however, was a very conservative one, and when the agitation arose for the Fourth Avenue Subway in Brooklyn it refused to sanction the route, although Mr. Belmont personally told me when I was Comptroller he would be willing to undertake the equipment and operation of the Fourth Avenue Subway clear to Coney Island on the same terms as Contract No. 1, and have it connect with the then existing subway for a 5-cent fare over the entire line. Conditions at the Brooklyn Bridge at that time, of course, were abominable and something had to be done. The Hughes-Hearst campaign for the governorship was on and the issue of municipal construction and operation became an important one. Mr. Hughes declared that if elected he would particularly see to it that the conditions on the Brooklyn Bridge were remedied and a new Rapid Transit Commission would be appointed which would handle the question of further facilities fearlessly and promptly. He was elected and redeemed his pledge by fathering the public service commission act and appointing the original Public Service Commission for the First District.

CITY DEMANDS MORE SUBWAYS

This commission immediately took up the Fourth Avenue Subway question, laid out a four-track route, but changed the original route from connecting with the then existing subway to one terminating at the Bowery and Canal Street over the Manhattan Bridge. I took the stand at that time, as Comptroller, when the contract for the first four sections amounting to $18,500,000 was to be approved, that the borrowing capacity of the city did not allow the certification of those contracts. But despite the question of the debt limit or the cost, and the fact that we were building only part of a subway, the final cost of which we had no knowledge, public clamor was so great that the Board of Estimate, as then constituted, would have approved the route and voted the money for the first six sections if I had not enjoined them by court action in a taxpayer's suit to ascertain what the debt limit was.

Under our Constitution New York can issue bonds only up to 10 per cent of the assessed value of its taxable property. This means, of course, that none of the property belonging to the city, state or the federal government can be taxed or assessed for tax purposes, neither can churches, hospitals or charitable institutions be taxed. It was customary whenever the city reached its margin or thereabouts to raise the assessed valuation of property, thus enlarging the borrowing capacity, and religiously see to it that every dollar of such increased margin was appropriated and disposed of within the year.

The courts sustained my contention as to what constituted municipal debt, my chief point having been that authorizations for improvements which had been voted should be considered in ascertaining the borrowing margin. At the time I brought the suit the city of New York had more than one hundred million dollars in authorizations outstanding, every dollar of which could have become debt the moment the borough president or heads of departments for whom the authorizations had been made should advertise and sign the contracts. Up to that time, however, these authorizations had never been considered, and the fact that they were outstanding was a menace which might at any time seriously involve the legality of bonds issued to pay the cost of such improvements.

SELF-SUPPORTING SUBWAY BONDS EXEMPTED

We had exempted from the debt margin bonds issued for water supply, and we had in 1907 and 1908 $45,000,000 of corporate stock (or city bonds) outstanding for the then existing subways, which were then self-sustaining. We also had about $50,000,000 worth of corporate stock outstanding for docks, which were more than earning the interest and sinking fund upon them. I sent a bill to Albany at the time allowing the city to exempt from its debt margin self-supporting bonds issued for subways or docks, expecting in this way to have released for further construction of subways $45,000,000 and for docks about $50,000,000. When the bill came back from Albany approved, it stipulated that the money could be used for docks and subways, with the result that eventually most of it was used for subways.

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*Abstract of address presented to New York Electrical League, New York, April 13, 1921.

Up to that time, while not openly a political matter, politics was played by the Public Service Commission against the Board of Estimate, and during the existence of the injunction not a thing was done by the Public Service Commission so far as bringing anything else but the Fourth Avenue Subway forward, although the increase in assessed valuations had raised our borrowing capacity sufficiently to do work in other directions.

DUAL SUBWAY PLAN AUTHORIZED

In the following election Mayor Gaynor and a fusion Board of Estimate, composed of Messrs. Mitchell, Prendergast and McAneny, were elected on a platform providing for municipal construction and operation of subways and attacks upon the then existing traction companies, the I. R. T. and the B. R. T. But during the life of that board the dual subway contracts were authorized and put into force by which the B. R. T. secured the operation of the Fourth Avenue Subway and extension of that subway up Broadway and into Queens, and the Interborough extension, out to East New York through Eastern Parkway, and the Bronx extension on Jerome Avenue and White Plains Avenue to the Mount Vernon line. Under the terms of these contracts, instead of carrying the interest and sinking fund charges, the companies were relieved of those expenses until they themselves earned a specified return upon their investment, and the city contributed what it had previously received from the Interborough as a preferential toward such earnings. In other words, the city has not since then received one cent, either for interest or for sinking fund, upon the $250,000,000 now invested in the subway system, and will not receive one cent until the companies receive the return provided for in the contracts upon their own invested private capital. Apparently that condition will never arise under contracts with which matters have been complicated.

We, as taxpayers, therefore, are paying into the budget every year for the debt service the amount of interest and sinking fund which should be paid by those using the subway. Our debt service today amounts to about $70,000,000 per year, and although the Constitution provides that the taxes for budgetary purposes; that is, the running expenses of the city, shall not exceed 2 per cent, the debt service is outside of that 2 per cent and may go on rising year after year. We are now on an average rate of 2.80 per cent for the various boroughs for this year, and the Board of Estimate was compelled to cut out of its estimates about $25,000,000 from the Board of Education allotment to keep within the constitutional 2 per cent limit.

In the meantime a 5-cent fare all over the city sounds good, but even with the dual system a passenger has to pay two fares if he goes from South Brooklyn above Forty-second or Fifty-seventh Street in Manhattan, and if by any chance he wants to go across town anywhere in any of the boroughs and needs to take more than one subway or trolley line he has to pay 5 cents each time he gets on a car or even into one of the Hylan buses. A 5-cent fare is a good thing if there is something to ride on, but where the trolley lines have stopped the public is walking.

During Governor Smith's administration attacks were made upon the Public Service Commission, with the result that the law was again changed and we had a double-headed body consisting of the Public Service Commissioner and the Transit Construction Commissioner, with the Board of Estimate having authority to pass upon routes and vote or deny the necessary funds, but with no power to do anything except make faces at the transit company or the receivers, who in the meantime had been appointed by the courts. Something had to be done to lodge authority somewhere to change the situation. The Board of Estimate takes the stand that if the companies cannot run for 5 cents they should lie down and the city will run the subways. Possibly the subways could be run for 5 cents and at a profit, but if everything else in town stopped, and the subways are now saturated to the limit during all hours, how and where would people find transportation facilities?

FACTS NECESSARY BEFORE SOLUTION IS POSSIBLE

The only way to solve the problem is to come to a showdown as to just what conditions are and what the cost of operation really amounts to, and the new law creates a commission with power to find out. Undoubtedly the railroad companies have been guilty of all kinds of high finance, and franchises obtained from the city for little or nothing have been manipulated and sold and watered stock issued against them, and leases and contracts with defunct companies are no doubt carried as assets and interest upon them is being charged against operating expenses. These should be wiped out. A franchise on which nothing can be earned is of no value, and bonds issued against such franchises are worth nothing at the present time, and this commission can find out how many such there are.

On the other hand, there is some real money in these corporations, and whatever value their stock has, be it ever so small, should and must be protected and cannot be wiped out entirely by a policy of confiscation. With a clean slate and the real value of properties ascertained, it may well be possible that a method can be evolved by which a 5-cent fare can be maintained and a profit made. But whether this is so or not, the people of New York will be entirely willing to pay for what they get, if they know what it costs, and if as taxpayers we are going to pay for the shortages, we ought to do it as a budget charge and not out of the debt service. This is simply a subterfuge which enables us to exceed the 2 per cent limitation for budget purposes.

The new commission has the power to ascertain the facts necessary for a basis on which to settle the question in the interest of all concerned, and to take the problem out of politics, so that future municipal elections at least will not be influenced by a feeling for or against public corporations, which are and must continue to be under State supervision and control. Until the bonds now outstanding become self-supporting and can carry themselves, the city will not have the means to take over existing transit lines or materially to extend present city-owned subways, and private capital will not unless guaranteed a safe and fair return. Unless, therefore, some means of carrying out either one or the other of these two alternatives is found, stagnation will continue and chaos result.

Turbine Oil Purification

The Continuous Filtration System, Which Retains the Original Lubricating Value of the Oil Almost Indefinitely, Has Practically Superseded Other Purification Methods

IN A RECENT article* Charles H. Bromley enumerates the severe conditions in steam turbine bearings that had to be contended with in the realization of a satisfactory system of lubrication. No satisfactory lubricant has been found which will not deteriorate under continuous use without purification. However, the problem of continuously maintaining the lubricating oil in first-class condition is limited principally to keeping it clean and dissipating the heat which it absorbs. The temperature of the oil in turbine bearings sometimes reaches 180 deg. Fahr., but the normal operating temperature is about 130 deg. This high operating temperature does not present any particular difficulty, for it is merely a matter either of increasing the rate of circulation or of installing more capacity in cooling coils.

On the other hand the problem of keeping the oil clean is most difficult, but its solution eliminates one of the most vulnerable features of turbine operation. One of the troubles encountered in an oil circulating system is that the rapid circulation of from seven to forty times per hour does not give the oil an opportunity to precipitate any moisture or foreign matter picked up in its circulation, nor does it permit the elimination of air or moisture which may have found its way into the oil.

The combination of water, air and heat and the rapid circulation of oil cause it to oxidize and readily form an emulsion, in which a brownish or light chocolate colored sediment is produced. Most of this remains in suspension in the oil if not continuously removed. Emulsion increases at an accelerated rate once a small amount has accumulated. If the oil receives no treatment at all, after a certain time its lubricating qualities disappear entirely. By adding "make-up" oil or "sweetening" oil, this period is only slightly increased, since the impurities, emulsions, sludge, etc., are not removed, but merely diluted.

The "batch" system is an improvement over those already mentioned, for the entire oil charge of the lubricating system is drained at definite intervals and if necessary a fresh supply of clean oil is introduced. The used oil is submitted to a filtration and purification process in which heating of the oil to a high temperature, precipitation and chemical treatments must be resorted to. Since the oil is renovated after it has reached a predetermined state of deterioration by draining the entire system, it becomes necessary to shut down the turbine units each time the oil is changed.

The continuous filtration system, which is almost universally used now, depends for its effectiveness upon continuously removing the moisture and other impurities which cause emulsification and sludge and deteriorate the lubricating value of the oil. Emulsion cannot take place if the impurities which cause it are removed as fast as they occur and will not form as the emulsion builds up.

In this system the oil leaving the bearings is filtered before it is returned to the turbine oil reservoir and is most positive and effective in maintaining the quality of the oil. Due to the small loss, oil of the very highest grade and type can be used economically. The oil becomes an investment rather than an expense.

The continuous by-pass system is extremely simple. It consists of a gravity oil filter and an oil pump. With proper oil and a clean circulating system there is no deterioration of the oil, because the circulation is so rapid keeping impurities in suspension; purification of the whole oil charge is so frequent that no sludge or muck accumulate, all the oil in the system passing through the filter every hour.

The process of purification is accomplished both by precipitation and filtration through closely woven cloth. By the former process oil is brought practically to rest and entrained water and heavy particles of foreign matter are allowed to settle out. The remaining impurities are then removed as the oil passes through the cloth filtering elements.

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*See *General Electric Review*, May, 1921. Mr. Bromley was formerly a member of the editorial staff of *Power*.

Train Operation in Kansas City

Kansas City Railways Is Experimenting with a Multiple-Unit Train Having Several Features Contributing to a Quick-Loading Scheme as a Rush-Hour Service Adjunct

WITH the idea in mind of being able to move rapidly a large number of people during the peak-load hours, provided ample provisions were made for quick loading, the officials of the Kansas City (Mo.) Railways have equipped experimentally a two-car train with multiple-unit control and other interesting features. To try out the experiment two old cars which had formerly been equipped with type M control were connected together with a control jumper and bus-line jumper so that the train could be operated with one trolley. Doors were installed on the front and rear platforms of both cars and arranged for air operation. The rear doors were arranged so that they could be opened from the street by a street collector. The platforms of these cars were rather short and consequently it was impossible to make the doors as wide as was desired, but by constructing them with two panels and by various experimenting they were made fairly satisfactory.

An arrangement was also worked out whereby the brakes are released as the doors close. A buzzer system whereby the conductor on the rear car can signal the crew on the first car was installed, the buttons for passengers not being connected through between the two cars. The compressors on the two cars were tied together electrically so that both start simultaneously whenever either governor cuts in. This arrangement was made in order to keep both compressors working if the adjustments of the governors were different.

Some difficulty was at first experienced in securing the proper operation of the electric switches located at numerous points over the system. This difficulty developed from the fact that both cars were taking energy from one trolley, so that the added load of the compressor, heaters and lights of the second car caused the switches to take the power-on position when the controller was in the off position. This was overcome by placing the heater switch for one car where the motorman could cut out the heaters when operating the electric switches.

The train has been operated with a crew of three men, a motorman and conductor on the first car and a conductor on the front end of the rear car. When the train passes through the congested district in the rush hour a street collector opens the rear door of the rear car from the street and collects fares from passengers boarding there. An additional street collector takes his position at the front door of the front car, so that the train is loaded through four doors at the same time. A further development in this connection, looking toward better efficiency, is contemplated.

This train has now been in operation for a number of weeks, with the result that it is felt that the idea is practical and capable of development. In speaking of this experiment Henry S. Day, equipment engineer, said: "We are taking our time in studying the operation of this train, and if we decide eventually to equip a number of trains for this service we shall equip them with a modern type of multiple-unit control and further develop the idea of rapid loading, which is, of course, absolutely necessary when a unit of this type is to be run on a line with single cars. We are now operating this equipment in the manner indicated and running on time, and I believe we can very much improve a good many features of the train as it now stands."

If the plan is carried out the multiple-unit control will probably be installed on some of the heavier types of cars owned by the company, which are not now run except in the rush hours. These cars can be utilized for rush-hour service and permitted to stand idle during the remainder of the day satisfactorily, for operation of these heavy cars during light-loading periods is of course very uneconomical, particularly in Kansas City, where there are many grades, some excessive, on all of the lines.

To Honor British Engineers

THE organized engineers of America will send a mission to London this summer to express the obligation which the world owes to the engineers of Great Britain for the part they played in winning the war. This mission, consisting of nationally known engineers and representing the so-called Founder Societies, will also make the award of the John Fritz medal to Sir Robert Hadfield at the opening meeting of the British Institution of Civil Engineers on June 29. The inability of Sir Robert to come to the United States to receive the medal moved the trustees of the John Fritz Medal Board of Award to make the ceremony of presentation in England the occasion for an international expression of appreciation by the engineers of the United States to the engineers of Great Britain.

The deputation to England will consist of Charles T. Main of Boston, representing the American Society of Civil Engineers; Colonel Arthur F. Dwight of New York, the American Institute of Mining and Metallurgical Engineers; Ambrose Swasey of Cleveland, the Joint Fritz Medal Board of Award and the American Society of Mechanical Engineers, and Dr. F. B. Jewett of New York, the American Institute of Electrical Engineers. Dr. Ira M. Hollis, president Worcester Polytechnic Institute and past-president American Society of Mechanical Engineers, will accompany the deputation and bear the message from the American engineers.

The adjustable seats for motormen on the Berlin street railways are fitted with an arm attached to the main support of the seat and about one-third of the way down. This arm passes between the legs of the motorman at about the height of his knees and helps to steady the seat when it is in use.

Two Years of Service

How the Illinois Committee on Public Utility Information Has Helped the Utilities of that State—Its Help Sought from All Parts of Country

THE Illinois Committee on Public Utility Information is two years old this month. It celebrates its second anniversary by passing the 5,000,000 mark in pieces of literature distributed. Its work has been so successful that similar bodies have been organized in nine other states—Indiana, Kentucky, Ohio, Nebraska, Missouri, Oklahoma, Arkansas, Wisconsin and Michigan—and its help is constantly sought, from all parts of the country, by newspapers wanting data pertinent to current news, by high school and college students facing a debate or a thesis, by lecturers wanting to freshen up platform material, by writers of circular, publicity and advertising matter for investment houses and so on.

Samuel Insull of the Commonwealth Edison Company is largely responsible for the organization of the committee. He conceived the general scheme and with the co-operation of both Bell and independent telephone interests the original membership of the committee in April, 1919, came to be as follows: John F. Gilchrist, vice-president Commonwealth Edison Company, chairman; Martin J. Insull, vice-president Middle West Utilities Company; Charles A. Munroe, vice-president Public Service Company of Northern Illinois and People's Gas Light & Coke Company (now president of American Gas Association); Britton I. Budd, president Chicago Elevated Railways; Bernard J. Mullaney, manager Public Relations Department, People's Gas Light & Coke Company; Clifford Arrick, publicity manager Chicago (now Illinois Bell) Telephone Company; W. S. Vivian, secretary-treasurer United States Independent Telephone Association.

The result is practically every electric, gas, electric railway and telephone company in the state is now co-operating and is represented on the (enlarged) committee through members designated by the state electric, gas, electric railway and telephone associations. The committee's work was organized and is still guided by Mr. Mullaney as director and H. M. Lytle, former financial editor of the Chicago *Record-Herald*, as associate director.

Out of the experience of all concerned in this Illinois campaign have come certain definite conclusions in relation to work of this character, among them the following:

Two important factors in the committee's success have been: (1) The careful way in which its work is done so that no accusation may lie against it of trying to mislead the public, and (2) the motive power supplied by the weekly meetings of the committee and the facilities of the committee members for getting close to local managers and spurring them to co-operative action.

This proximity and local contact are essentials usually lacking in educational campaigns of national scope, when directed from one central point. The Red Cross, the Liberty Loan, the Salvation Army and other war organizations found they could not get publicity results by operating nationally; they had to organize regionally by states and by communities. The Illinois plan establishes this local contact and, when adopted in every state, provides the machinery for giving national scope and effect to any kind of utility campaign, whether general or special.

ELECTRIC RAILWAY PUBLICITY

Devoted to How to Tell the Story

Safety Car Boosting in Los Angeles

An Illuminated Map Is Used in Conjunction with a Chart to Show the Development of Safety Car Operation Throughout the United States

ILLUSTRATING the number of safety cars in the United States and the growth in orders from 1915 to 1920, an illuminated map, which was exhibited by the Westinghouse Electric & Manufacturing Company at the Atlantic City convention of the American Electric Railway Association, is being displayed by the Los Angeles (Cal.) Railway. The map has been mounted in the lobby of the main offices and has attracted widespread attention.

The map measures 7 ft. x 11 ft. and shows every city that operates safety cars. With the map is a chart showing the curve of orders from two cars in 1915 to 2,100 in 1920, with a total of approximately 4,400. As the first lights appear on the chart, corresponding lights appear on the map showing the cities in which the early deliveries were made. This scheme of corresponding lights on the chart and the map continues until the entire map is illuminated.

The number of safety cars in each city is indicated by the color of the light. A white light shows fewer than twenty-five safety cars; blue from twenty-five to forty-nine; green, from forty-nine to ninety-nine, and red for more than 100.

The significance of the map is explained by cards attached to it, and pictures of safety cars in operation on Los Angeles streets have been placed with the exhibit.

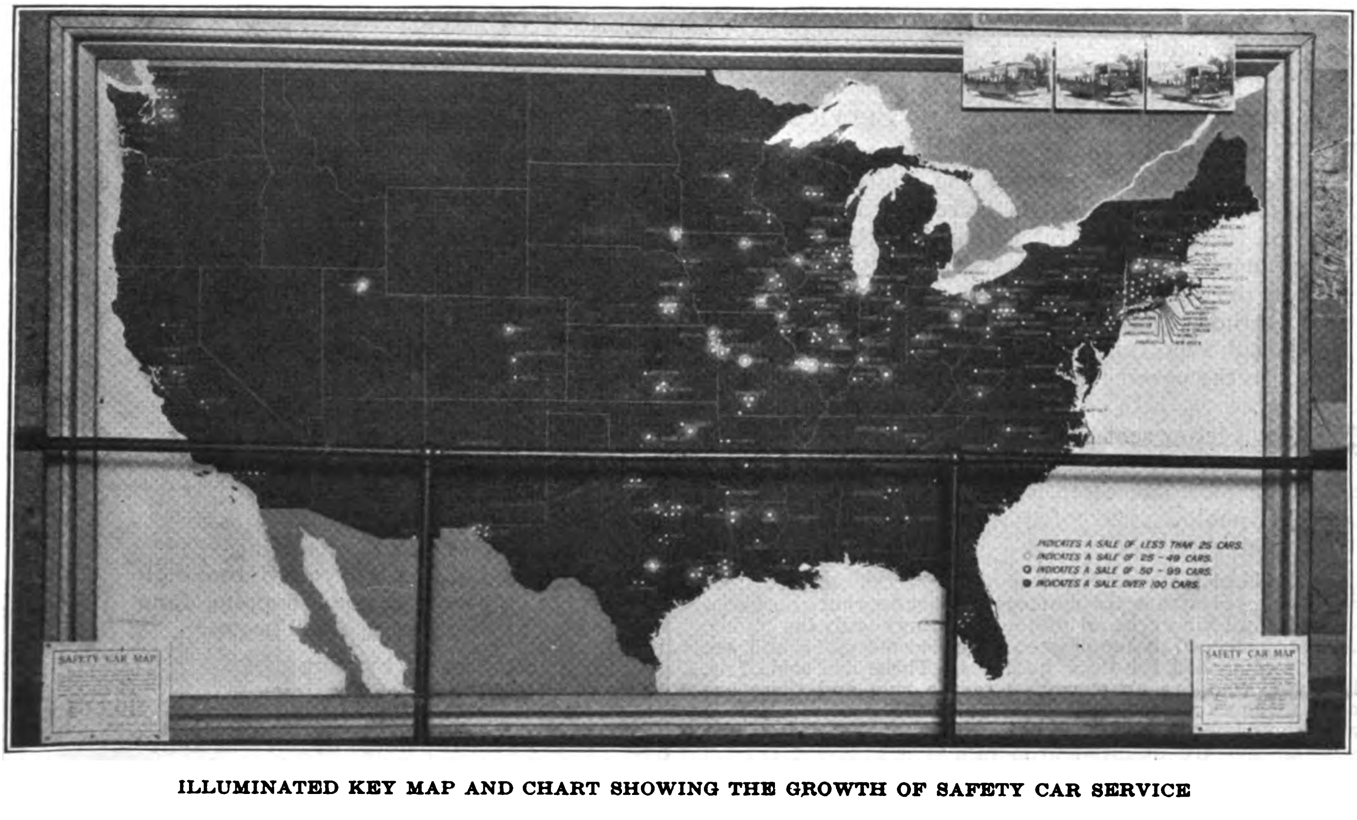
Cards in all street cars advertise the map and invite those interested in street car service to inspect the exhibit. Newspaper publicity and advertising have been utilized, particularly in community papers of the districts served by safety cars.

The exhibit was used in connection with the establishment of safety car service on two lines of the Los Angeles Railway running through the downtown district. Following the display of the map in the main offices, it is planned to place it in a store window in the main part of the city.

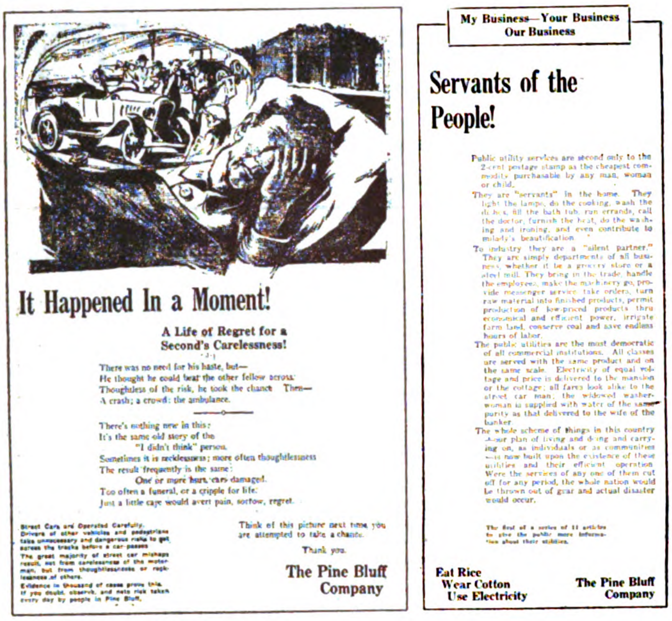
A Campaign of Instruction

THE Pine Bluff (Ark.) Company recently undertook a campaign to give the public more information about the utilities. A method was employed similar to that effectively used in the Doherty thrift campaign. The series was made up of fourteen articles, which appeared at more or less regular intervals in the local newspaper.

The aim of this publicity was merely to get the people thinking about the utilities. The first one told how dependent a community is upon the existence of the utilities and their efficient operation. The second said that the community's biggest single investment is in its utilities and that in Arkansas they pay more than one-fifth of all the state taxes. In another the fact was


INDICATES A SALE OF LESS THAN 25 CARS.
○ INDICATES A SALE OF 25 - 49 CARS.
◉ INDICATES A SALE OF 50 - 99 CARS.
● INDICATES A SALE OVER 100 CARS.
SAFETY CAR MAP
SAFETY CAR MAP

ILLUMINATED KEY MAP AND CHART SHOWING THE GROWTH OF SAFETY CAR SERVICE



It Happened In a Moment!

A Life of Regret for a Second's Carelessness!

There was no need for his haste, but—
He thought he could beat the other fellow across.
Thoughtless of the risk, he took the chance. Then—
A crash; a crowd; the ambulance.

There's nothing new in this;
It's the same old story of the
"I didn't think" person.
Sometimes it is recklessness; more often thoughtlessness
The result frequently is the same:
One or more hurt, cars damaged.
Too often a funeral, or a cripple for life.
Just a little care would avert pain, sorrow, regret.

Street Cars are Operated Carefully. Drivers of other vehicles and pedestrians take unnecessary and dangerous risks to get across the tracks before a car passes. The great majority of street car mishaps result, not from carelessness of the motorman, but from thoughtlessness or recklessness of others. Evidence in thousand of cases prove this. If you doubt, observe, and note risk taken every day by people in Pine Bluff.

Think of this picture next time you are attempted to take a chance.

Thank you.

The Pine Bluff Company

My Business—Your Business Our Business

Servants of the People!

Public utility services are second only to the 2-cent postage stamp as the cheapest commodity purchasable by any man, woman or child.

They are "servants" in the home. They light the lamps, do the cooking, wash the dishes, fill the bath tub, run errands, call the doctor, furnish the heat, do the washing and ironing, and even contribute to milady's beautification.

To industry they are a "silent partner." They are simply departments of all business, whether it be a grocery store or a steel mill. They bring in the trade, handle the employees, make the machinery go, provide messenger service, take orders, turn raw material into finished products, permit production of low-priced products thru economical and efficient power, irrigate farm land, conserve coal and save endless hours of labor.

The public utilities are the most democratic of all commercial institutions. All classes are served with the same product and on the same scale. Electricity of equal voltage and price is delivered to the mansion or the cottage; all fares look alike to the street car man; the widowed washerwoman is supplied with water of the same purity as that delivered to the wife of the banker.

The whole scheme of things in this country—our plan of living and doing and carrying on, as individuals or as communities—is now built upon the existence of these utilities and their efficient operation. Were the services of any one of them cut off for any period, the whole nation would be thrown out of gear and actual disaster would occur.

The first of a series of 11 articles to give the public more information about their utilities.

Eat Rice
Wear Cotton
Use Electricity

The Pine Bluff Company

AT LEFT, AN ADVERTISEMENT IMPRESSING THE RESULT OF CARELESSNESS. AT RIGHT, THE FIRST ARTICLE OF THE SERIES GIVING INFORMATION ABOUT THE UTILITIES

brought out that every community is known and judged by its utilities; that where the service of utilities is not efficient, experience warrants the deduction that some influence is at work which threatens the desirability of that community as a place of residence and occupation, making it a good place in which not to invest money—a good place to stay away from. Thus, in the series of articles the facts are laid before the public in an unbiased and matter-of-fact way.

Besides this educational campaign the Pine Bluff Company has tried to promote the safety movement by the insertion in the newspapers of advertisements which bring home to the reader the penalty of carelessness and thoughtlessness. One that appeared recently is reproduced herewith.

Courtesy an Essential of Service

THE courtesy of employees on the properties managed by Britton I. Budd, the Chicago Elevated Railways, the Chicago, North Shore & Milwaukee Railroad and the Chicago & Interurban Traction Company, has frequently been the cause of complimentary comment on the part of patrons. This is particularly true of the trainmen on the North Shore Line, a fact that has undoubtedly contributed materially to the great growth in the passenger business of this high-speed interurban.

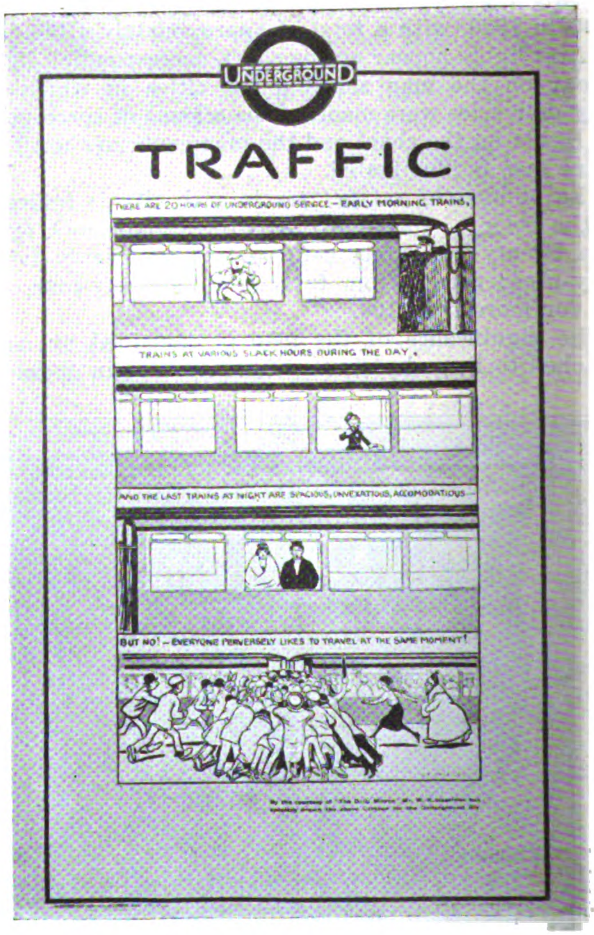
A recent letter sent out to all employees by Mr. Budd is an example of how the employees are impressed with the importance and essentiality of courtesy in dealing with the public.

The letter follows:

> It has been the established principle of the elevated lines for many years that the employees must be courteous, considerate and kindly in all of their dealings with the public. The majority of the employees have become noted and are often commended for these qualities. There are some few, however, who are an exception to the rule and there are others who do not make the effort which they should. Little attentions and courtesies make your day's work easier, cost nothing and are essential to maintaining the good opinion of the public.
>
> You are all salesmen and saleswomen, selling the only product the company has, which is transportation. If you patronize stores where you are gruffly treated or where your patronage is not welcome and you do not receive proper attention, even if it might not be termed discourteous, you transfer your patronage elsewhere. Transportation on any particular line is not compulsory and people will go where they are treated with the most consideration and obtain the best service. The attitude of the employees is one of the biggest elements in the word "service." Service performed by employees which in their relations with passengers may not be required of them very frequently offsets some inconvenience a passenger may have met.
>
> The public is well aware that the increase in fares is largely, if not wholly, due to the increase in wages which you have received. In other words, passengers are paying you your increased wages, and when they meet with discourtesy, indifference and lack of consideration, it is perfectly natural that they should resent it.
>
> Hereafter, any employee coming in contact with the public as a representative of the company, who is discourteous, indifferent or incapable of reflecting the spirit which actuates a majority of the employees, will be considered a detriment to the interests of both the employees and the company, and his or her services with the company will be dispensed with.

Lady, Lady, Shopping

(5:30 P. M. in the Evening)


UNDERGROUND
TRAFFIC
THERE ARE 20 HOURS OF UNDERGROUND SERVICE — EARLY MORNING TRAINS,
TRAINS AT VARIOUS SLACK HOURS DURING THE DAY,
AND THE LAST TRAINS AT NIGHT ARE SPACIOUS, UNVEXATIOUS, ACCOMODATIOUS —
BUT NO! — EVERYONE PERVERSELY LIKES TO TRAVEL AT THE SAME MOMENT!

LADY, Lady, shopping—
Rather late you're stopping!
Can't you get your shopping done
Till the evening's well begun?

Lady, Lady, hunting
Half a yard of bunting—
Can't you search that bargain store
'Twixt the hours of ten and four?

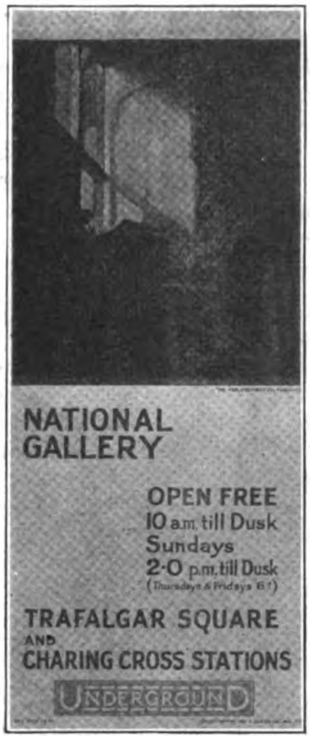
More of London's Merchandising Picture Talks

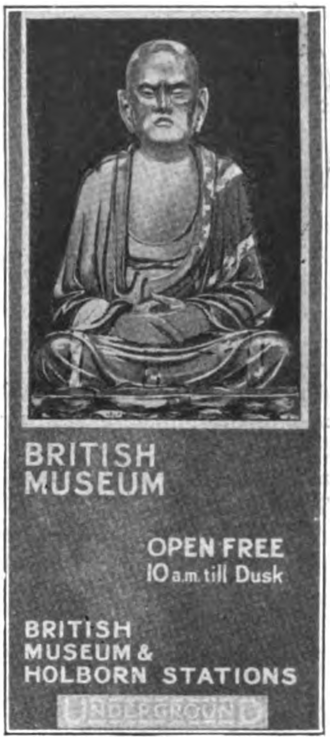
Attractive Colored Posters Used to Advertise Points of Interest Reached

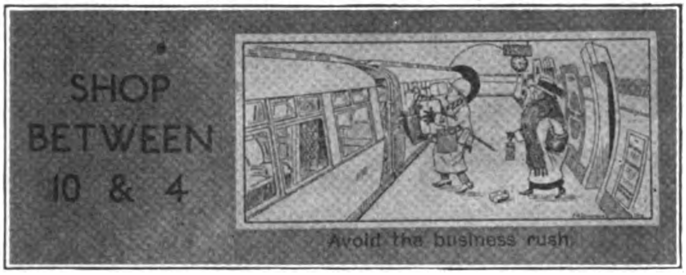
FEW ELECTRIC or steam railroads in this country carry out the transportation merchandising plan of the London Underground System. The accompanying illustrations show miniatures of some of the posters that have recently been put out to develop new traffic and to spread out the existing traffic on its lines. Some of these posters are intended for display in the stations on billboards, while those urging patrons to shop outside the rush hours are for display in the cars.

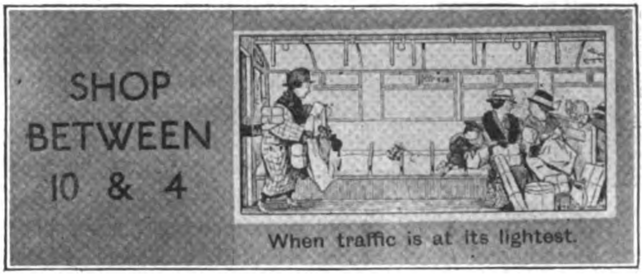
The merchandising idea of selling service is portrayed in these posters in a variety of effective appeals. Take, for instance, the zoo poster with its animal border. This creates an immediate desire to see them alive—hence a ride. The same can be said of the museum posters.

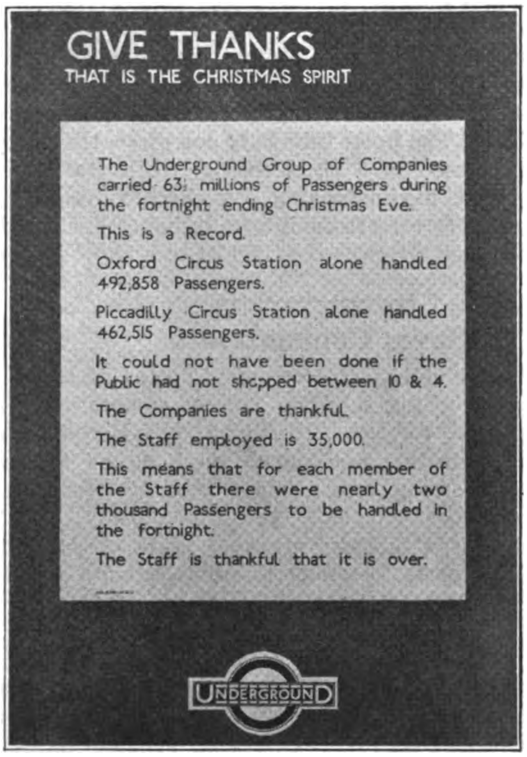
The ideas in the poster "Give Thanks" undoubtedly express the feelings of many a manager and operating man after a period of heavy traffic—but unfortunately very few if any have taken it upon themselves to capitalize the favorable feeling that the public has toward them after such a period. What a chance they have lost to hold the graces of their patrons! Traffic managers that take these ideas and apply them to local points of interest will not only be selling their own product but will be boosting the community served.


NATIONAL GALLERY
OPEN FREE
10 a.m. till Dusk
Sundays
2·0 p.m. till Dusk
(Thursdays & Fridays 6 [illegible])
TRAFALGAR SQUARE AND CHARING CROSS STATIONS
UNDERGROUND


BRITISH MUSEUM
OPEN FREE
10 a.m. till Dusk
BRITISH MUSEUM & HOLBORN STATIONS
UNDERGROUND


SHOP BETWEEN 10 & 4
Avoid the business rush


SHOP BETWEEN 10 & 4
When traffic is at its lightest.



GIVE THANKS

THAT IS THE CHRISTMAS SPIRIT

The Underground Group of Companies carried 63½ millions of Passengers during the fortnight ending Christmas Eve.

This is a Record.

Oxford Circus Station alone handled 492,858 Passengers.

Piccadilly Circus Station alone handled 462,515 Passengers.

It could not have been done if the Public had not shopped between 10 & 4.

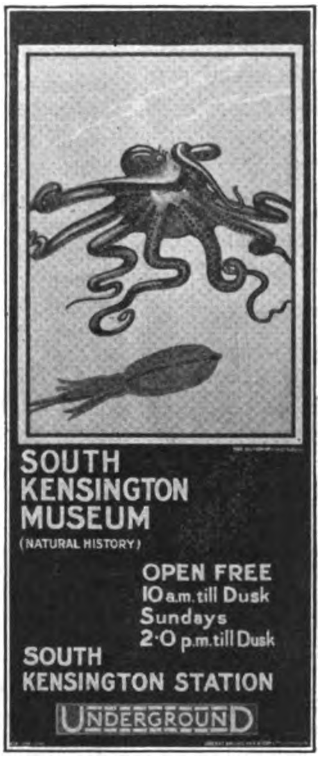
The Companies are thankful.

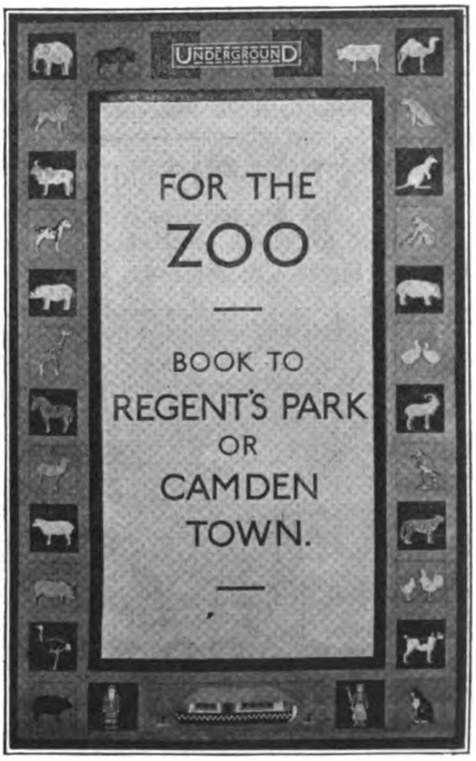
The Staff employed is 35,000.

This means that for each member of the Staff there were nearly two thousand Passengers to be handled in the fortnight.

The Staff is thankful that it is over.

UNDERGROUND


SOUTH KENSINGTON MUSEUM
(NATURAL HISTORY)
OPEN FREE
10 a.m. till Dusk
Sundays
2·0 p.m. till Dusk
SOUTH KENSINGTON STATION
UNDERGROUND


UNDERGROUND
FOR THE ZOO
BOOK TO REGENT'S PARK OR CAMDEN TOWN.

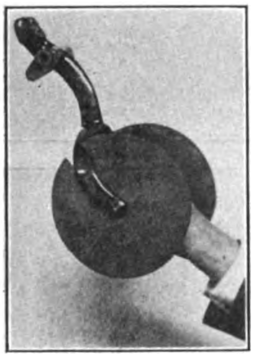
New Line of Switchboard Instruments

30
60
90
120
150
D.C.VOLTS

SWITCHBOARD VOLTMETER

THE Westinghouse Electric & Manufacturing Company has just placed upon the market a new line of ammeters and voltmeters for switchboard use. These instruments operate on the D'Arsonval principle and the movement, complete with the core and pole pieces assembled, can be removed as a unit, thus facilitating inspection and repairs. These instruments are designated as type SX and are finished in a dull black marine. The overall dimensions are $7\frac{7}{16}$ in. in diameter and $2\frac{11}{32}$ in. deep. The weight of each instrument is 9 lb.

Making Breaker Arms Safe

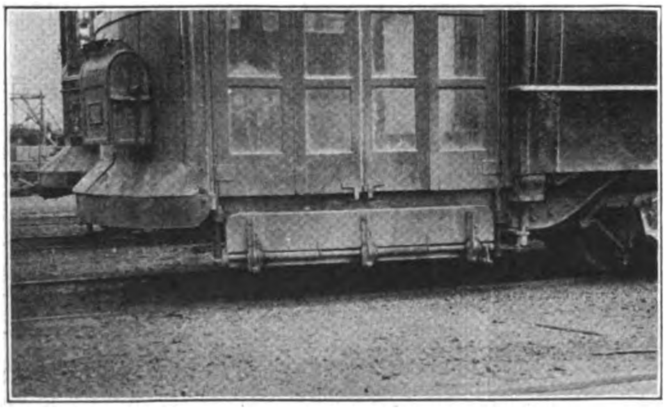


SAFETY DEVICE FOR BREAKER ARM

TO PREVENT an operator from coming in contact with the metal part of a breaker arm while taking hold of the handle, J. O. Penisten, superintendent of power distribution of the Union Traction Company of Indiana, has developed the safety device shown herewith. It consists of two large insulating disks placed at the sides of the handhold on the alternating-current circuit breaker arms of substation switchboards. As ordinarily constructed, the operator is quite liable to slide his hand over so as to come in contact with the metal arm while some part of his body is in contact with a ground. The use of these insulating disks makes it impossible for the operator to touch the metal arm of the breaker in its ordinary operation.

A Balanced Folding Car Step

A SCHEME for hanging folding steps has been devised by C. R. McMahon, master mechanic Des Moines (Iowa) City Railway, which materially lightens the labor involved in operating the step and door mechanism. The scheme consists simply of mounting the step so that the axis or hinge point is about one-third of the way out on the step board, instead of being at the inner edge of the step as is usually the case. This one-third of the step on the inside of the hanger acts as a counterbalance against the other two-thirds as the step is raised. In other words, instead of having to pull up the weight of a step 12 in. wide, the operator has only to lift the weight of an 8-in. width step, counterbalanced by the other 4 in. The step mounting is shown in an accompanying picture.

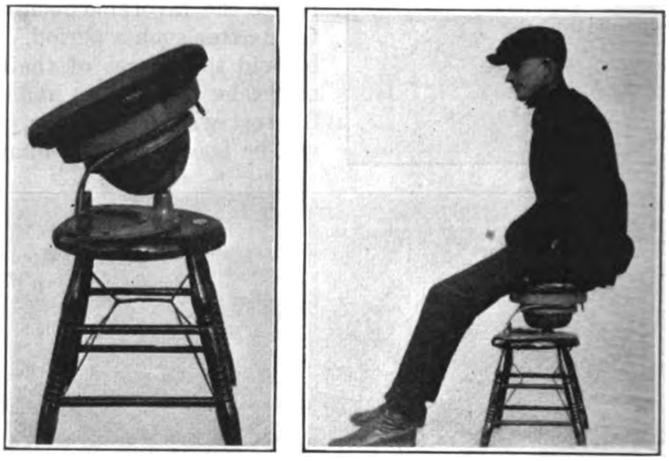


COUNTER-BALANCED STEP MOUNTING USED IN DES MOINES

Pneumatic Seat for Motormen

THE accompanying illustrations show a new type of pneumatic seat which has been in use on two cars of the San Francisco, Napa & Calistoga Railway during the past three months. It has proved so satisfactory that the company is now installing this device on the remaining cars of the system. It is the design of Henry Seibel of San Francisco.

In the construction of the seat an air cushion takes the place of steel springs, which are sometimes used, and absorbs the vibration. This air cushion consists of an inner tube, an outer flexible casing and a deformer. Both the inner tube and the outer flexible casing are made of rubber. The inner tube is in one piece, the upper part being inclosed in a rigid casing, while the lower end fits into the flexible casing. A check valve is inclosed in the inner tube to facilitate its being filled with air. As now used the seat is attached to a short-legged stool.



NEW TYPE PNEUMATIC SEAT FOR MOTORMAN

Saves Commutators

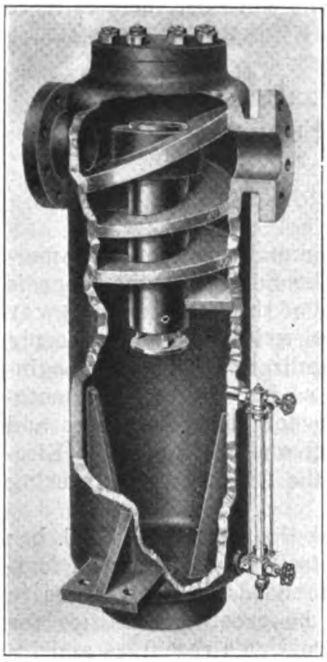
A NEW, easy and most economical means of keeping oil from working into the ends of commutators is now being used by the Pittsburgh (Pa.) Railways. After trying all the well-known methods of taping, wrapping with string, etc., a "dope" was evolved which does the work most efficiently and economically.

The "dope" is a mixture of equal parts of dextrine and plaster of paris to which is added enough shellac to make the preparation thin enough to apply with a brush.

After the mica and copper at the commutator's end are thoroughly cleaned, the "dope" is applied so that it completely covers the ends of the bars and the V-ring. After this has dried for twenty-four hours it is said to be thoroughly set and absolutely impervious to any oil which would otherwise get into the commutator. When the "dope" is put on an armature which is later dipped and baked the baking process strengthens it.

The Pittsburgh Railways says this new dope is saving money both in reduction in the number of armatures having oil in the commutator end and in the cost of trying to prevent oil from seeping in. The company is "doping" about twenty-five commutators a day. J. H. Klein is the foreman of the armature winding department, where this "dope" was evolved and is applied.

Improved Centrifugal Separator



CENTRIFUGAL SEPARATOR

THE accompanying illustration shows a redesign of the Stratton separator, which is being placed on the market by the Griscom-Russel Company, New York. In the redesign of this separator the helical path has been lengthened in order to increase the centrifugal separating action. The manufacturers claim that this feature, together with the spatter cap on the outlet pipe, greatly increases the separating efficiency. This type of separator is used for the removal of water from both steam and air systems.

Turning Car Wheels in Small Lathe

THE mechanical department of the Union Street Railway, New Bedford, Mass., has succeeded in adapting a 28-in. Manning, Maxwell & Moore lathe to the turning of all its steel car wheels which run as high as 33 in. in diameter exclusive of flanges. The company was formerly obliged to send all wheels outside for turning, the larger ones being sent to Philadelphia. This involved not only the outside charges but also freight bills and delays incident to shipping by freight. The 28-in. lathe which was already in the shop was rugged enough to handle this class of work if the diameter limitation could be overcome.

To increase the swing of the lathe three iron castings were secured and machined to fit the track on the lathe bed and were placed respectively under the headstock, tailstock and center-rest, raising the three working parts of the machine to an additional height of 4½ in., so that now the 28-in. lathe will swing a 37-in. diameter.

The wheels are not removed from the axle, the whole unit being placed in the lathe, after the rough hard surface of the wheels has been removed in the grinder to save wear on the lathe tools. A pair of dogs are attached to the faceplate at opposite sides of the center and bolted to the "near" wheel, giving a steady uniform drive free from vibration and preventing eccentricity in cutting which might result if the wheel were driven from one side only. These dogs were made by bending 1-in. x 5-in. wrought-iron bars into U-shaped fittings with lugs at the tips.

Perforating Ties to Insure Complete Impregnation

A MACHINE for perforating ties before impregnation has been developed and installed at the plant of the St. Helen Creosoting Company, St. Helen, Ore. It was designed and built by Greenlee Brothers & Company of Rockford, Ill. On page 560 of the ELECTRIC RAILWAY JOURNAL for March 19 was described a machine for puncturing the butts of poles before treatment which operated by dropping chisel-shaped bars on the pole. The perforating machine used for ties operates on a different principle. The ties are subjected on all sides to the rolling action of four toothed drums, two rotating on vertical axes and two on horizontal. The teeth are so spaced that incisions are made both across and along the grain and so that those along the longitudinal axis of the ties form diagonal lines. The diameter of all the drums is 14½ in. The speed of the machine is 70 lin.ft. per minute and it handles ties up to a maximum size of 8 x 14 in.

The lower horizontal drum and the right-hand vertical drum, looking in the direction in which the ties are fed into the machine, are located rigidly and both are driven by gearings mounted upon the side of the machine arranged to receive its power from a 15-hp. motor. The top horizontal drum and left-hand vertical drum are flexibly and adjustably mounted for variations in the tie sizes, and are furthermore provided with flexible connections which will permit of a rocking or tilting position for perforating ties of more or less irregular form. In addition to the four principal drums there is provided a counterweighted or spring-actuated pressure roll, power driven from the same motor and adjustably hinged in the front of the horizontal drum as an aid to the operator in lining up the ties against the rear fence as they are inserted in the machine, thus assuring a straight and true feed.

The two adjustably mounted drums are fitted with heavy coil springs, provided with tension adjustments arranged to give the necessary force to the drums for properly performing their perforating functions. The maximum pressure provided for in these springs amounts to 25,000 lb.

Each drum contains twenty-five toothways, arranged to carry the teeth for perforating at approximately 2-in. distances lengthwise on the timber. The teeth are placed in these toothways with spacing blocks for 1¼-in. tooth centers. The teeth are of hardened, tempered tool steel, designed to project ⅜ in. from the surface of the drum. The face of the drum is in contact with the ties as they are passed through the machine, so that the teeth penetrate into the wood the full length of their projection from the surface of the drum.

The development of this method makes it possible to treat the tie with a minimum reduction in its natural strength and durability, so that its maximum mechanical life can be obtained. Hitherto deep penetration of preservatives into the wood has been obtained only at a sacrifice of from 30 to 40 per cent of the natural strength of the wood, due to the continued subjection to the treatment at a high temperature. Under this process lower temperatures and less time for treatment are required, so that there is a reduction of not more than 8 to 10 per cent of the strength of the timber in compression perpendicular to the grain. Thus a reduction in the present loss in strength and mechanical life of treated perforated ties reaches the point where the cost of treatment is justified.

Letters to the Editors

Maintenance Cost on a Car-Weight Basis

NEW YORK, April 18, 1921.

To the Editors:

In connection with the article entitled "Why Alter the Standard Safety Car Design?" by J. C. Thirlwall, which was published in the April 16 issue of the ELECTRIC RAILWAY JOURNAL, I find the analysis of maintenance cost as affected by car weights particularly interesting. The basis for arriving at the relative values, however, is not quite clear to me. As I understand it, the author says that at least one-fourth of the cost for maintenance of way and structures and fully one-half the cost of equipment maintenance are affected by the weight and size of the car body. If you have data available that will illustrate these deductions, I should be interested in obtaining them. "ENGINEER."

[EDITORS' NOTE—The above question was referred to Mr. Thirlwall and he has furnished the reply given below.]

SCHENECTADY, N. Y., April 20, 1921.

To the Editors:

I do not suppose any two men in the country will agree on the actual effect of car weights on average equipment maintenance or track maintenance. I arrived at my figures by some such line of thought as this:

From figures I have seen it appears that of the total maintenance of way and structures about two-thirds is the actual maintenance of the roadway; that is, the money spent on renewals of rail, special trackwork and ties and in tamping up weak joints. It is of course obvious that a considerable part of the deterioration of rail and of ties is caused by weather conditions rather than the weight that passes over them, but on the other hand it is equally certain that a large part of rail wear and practically all cases of loose joints can be attributed to weight. It is also certain that, theoretically, tie spacing can be proportioned to the weight carried on any given size of rail, and many roads have taken advantage of this fact to space ties much wider apart since the introduction of lightweight city and interurban cars than they had previously done.

I, therefore, estimate that of the 65 per cent of the total which goes into track maintenance about 40 per cent is caused by weight, or approximately 25 per cent of the total.

On equipment maintenance, I figured brakeshoe and wheel wear is directly proportional to the weight carried, compressor maintenance is very nearly proportional, the gearing wear and motor bearing wear are directly dependent upon the weights moved. With any given size motor the heating increases roughly as the square of the weights handled, and, in the particular case I had in mind, we believe the maximum safe capacity of the motors has been reached with the present weight of the standard safety car and that any material increase will tend considerably to reduce the life of the motor insulation. In other words, while the 25-hp. motor can handle considerably greater weights provided the schedule speeds and number of stops are moderate, we feel that when stops run to nine or ten per mile and the maximum speed possible under these conditions is used, 16,000 lb. dead weight is about all that the motors should be called upon to handle. The heavier the car the greater becomes the burning of control fingers and of circuit breaker tips, two doors with their mechanisms obviously require more repairs than one, a greater area of body requires more paint Balancing all these points together and comparing with the relatively small proportion that are unaffected by the size and weight of the body leads me to believe that at least half of the total maintenance is affected by the body weight.

Of course, as I said before, I do not expect that all equipment engineers will agree with my estimates, but there are probably as many who will raise them as there are who will reduce them. J. C. THIRLWALL.

National Standardization Movement Deserves Support

PUBLIC SERVICE RAILWAY
CAMDEN, N. J., April 21, 1921.

To the Editors:

I note the editorial on the annual report of the American Engineering Standards Committee and the synopsis of the report, in the last issue of the ELECTRIC RAILWAY JOURNAL. As you know, the writer has been deeply interested in national standardization from the beginning of the movement, first as one of the representatives of the American Society of Civil Engineers and at present also as representative of the American Electric Railway Association on the American Engineering Standards Committee.

It seems particularly fitting that the A. E. S. C. has just at this time established itself on a substantial footing to "Americanize" our standards. There seems to be a general cognizance of the great possibilities for this work for savings of the nation's resources and industry. This is particularly apparent from the interest that is being shown by such important national bodies as the United States Chamber of Commerce, the American Association of Manufacturers and the Department of Commerce of the United States under the able leadership of Secretary Hoover. There is no doubt that a wider use of standards would stabilize both labor and capital to a great extent. Standardization would allow stocking up in dull times.

The executive committee of the American Electric Railway Association, at its last meeting, instructed all of the standing committees carefully to go over the Engineering Manual and pick out all standards that in their judgment should be submitted to the A. E. S. C. for approval. These reports will be submitted to the standards committee of the American Electric Railway Engineering Association and if approved by the executive committee will be submitted with all pertinent facts to the A. E. S. C.

One thing the American Electric Railway Engineering Association has been trying to do in the past has been to induce a wider use of the standards that it now has and that have cost the association so much time and labor. Although it is almost a crime, in these days when we are trying to increase production at a reduced price, to change a recognized standard just for some personal whim, it is not uncommon for those who have authority to this end actually to do this very thing. Those who have carried on this expensive practice in the past without proper regard to the association stamp of approval will not be so prone to do so if the particular association standard has been "Americanized" by the A. E. S. C. Besides, the manufacturers or selling companies would be in a better position to take exception to proposed changes in standard materials and specifications that would yield no apparent benefit.

It is hoped the members of the American Electric Railway Association will support the American Engineering Standards Committee to the limit and cooperate with it, which will be an action that will not only benefit a particular class, but the country and world as a whole.

MARTIN SCHREIBER,
Chairman Standards Committee,
American Electric Railway Engineering Association.

San Francisco Municipal Railway

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
Bureau of Engineering

April 20, 1921.

To the Editors:

In your issue of April 9, page 697, under the caption "Municipal Railway Falling Behind," by tables of computed figures an effort is made to discredit the operations of the Municipal Railways of San Francisco.

A deadly parallel is used to accomplish this purpose and an analysis of the table at the bottom of the page will show how very unfair the arrangement of this table is. The mileage of the United Railroads is 244.24, or about four times that of the Municipal Railways. You charge up to Maintenance Account for our mileage $667,506 as against $972,808 for the United Railroads and endeavor to soft-pedal this discrimination by the footnote carrying the depreciation on the United Railroads as included in the two previous accounts of Way and Structures and Equipment. This, of course, is juggling with figures and a solution in which the city must decline to acquiesce.

Substantially, to date, since the city started this enterprise there was a capital investment of $5,826,552.47. Eight hundred and ninety-nine thousand three hundred dollars of this capital has been paid back as the installment bonds matured. One million one hundred and eighty-eight thousand one hundred and fifty dollars of the earnings have been invested in making extensions and betterments to the original 45 miles of line. Cash assets in our treasury amount to $1,266,832.01, or a net earning of very nearly $3,300,000, besides paying interest on all outstanding bonds, and all accomplished since the Municipal Railways started operating, and without increasing the fare beyond 5 cents and paying $5 for eight hours' work to the carmen.

If this activity can be classified as "falling behind" we are quite willing to fall by paying our debts as bonds mature and making necessary extensions out of our earnings, which are rapidly accumulating.

Strange as it may seem this Municipal Railway has been kept out of politics and conducted on clean business principles. It is a pronounced success and has the good wishes of all the citizens of San Francisco as well as the admiration of all officials and visitors from other cities who come to see our activities.

M. M. O'SHAUGHNESSY,
City Engineer.

[In the article referred to it was not the purpose to show the results of operation or the financial condition of either the Municipal Railway or the United Railroads over the entire period of time that the Municipal Railway has been in operation. The thought was to show only the results of operation of the two systems for the year ended June 30, 1920, which was done. No attempt either was made to show or analyze the balance sheets for the two operating companies.

With regard to the depreciation item for the United Railroads, subsequent information shows that the United Lines actually added to its depreciation reserve $550,000 from its profit and loss account for the year. This undoubtedly should be added to the figure of $972,808, to give a fair comparison between the two systems. This would change the total maintenance expenses per car-mile from 3.791 to 5.941 cents, the car-hour expenses from $0.334 to $0.523. The percentage of revenues and expenses would be 16.89 and 21.86 instead of 10.78 and 15.20 respectively; the other percentages in these columns would necessarily have to be changed accordingly.—EDITORS.]

Association News

Committee on Purchases and Stores Meets

ON APRIL 22 the committee on purchases and stores of the Engineering Association held its initial meeting at association headquarters. Among those in attendance were W. H. Staub, purchasing agent United Railways & Electric Company, Baltimore, Md., chairman; J. Fleming, Capital Traction Company, Washington, D. C., and W. H. Ford, Memphis (Tenn.) Street Railway. The committee discussed many matters in general pertaining to the purchase of materials and supplies, and agreed to collaborate with the committee on stores accounting of the Accountants' Association with the object of submitting a joint report covering general subjects of stores accounting. It is the idea of this committee to include consideration of a material classification applicable to electric railways, similar to the one recommended by the Railway Storekeepers' Association for steam road operation. The committee will also ask those interested in purchasing subjects to submit suggestions for presentation by papers and discussion in an open meeting. The committee asked that a purchases and stores department section be inaugurated in *Aera* question box.

National Electric Railway Day

THE idea of setting aside May 4 as National Electric Railway Day has met with none but favorable response. While some companies have said they could not stage a public demonstration such as a parade, all have said that the idea was to be commended and they would do whatever was possible to help in calling the attention of the developments in the electric railway industry to the public, through the display of advertising matter and local newspaper stories.

The attitude in general taken by the companies replying to President Gadsden's recent letter is reflected by such statements as "the plan has our most hearty approval and you can depend on us for a most liberal program," "we will with pleasure and enthusiasm join in the program," "we are very much interested in the program and will be pleased to get the publicity matter," "we approve of the enterprise and will give the movement our fullest support."

Among the companies that have signified their intention of participating either wholly or in part are the Connecticut Company; Charleston (S. C.) Consolidated Railway & Electric Company; Schuylkill Railway Company, Girardville, Pa.; the Shreveport (La.) Railway; Morris County (N. J.) Traction Company; Chicago, Ottawa & Peoria Railway; Springfield (Mo.) Traction Company; Eastern Pennsylvania Railways, Pottsville, Pa.; United Railways & Electric Company of Baltimore.

The New Orleans Railway & Light Company is to put on the entire program some time in June, as it could not complete its arrangements at an earlier date along the lines it desires. Efforts are being made to get the Virginia Railway & Power Company to operate if possible one of its first electric cars over the original route in Richmond.

The advertising section of the Association's Bureau of Information and Service, which has this matter in charge, has already sent a national story on the developments of the industry to all newspapers. Copies of the same story, supplemented by photographs of two old cars, for reproduction, have been sent to the electric railways. Wall cards showing the growth in car design, for display in waiting rooms and other points of congregation, as well as a leaflet for distribution have been prepared and sent to all operating companies in the country.

While only a limited supply of leaflets has been sent, the association is in a position to furnish additional copies for general distribution at actual cost upon request. These illustrated leaflets have a wide field for distribution as the pictures contained therein enable the companies to put over the idea easier than with non-illustrated reading matter.

Chamber of Commerce President Addresses Camden Section

THE regular monthly meeting of the Camden company section of the American Association was held at the Newton Avenue carhouse on April 21, with seventy-five members in attendance.

At the request of President Wallace, LeRoy A. Goodwin, president of the Chamber of Commerce, Gloucester City, and president of the Rotary Club, Camden, addressed the meeting, bringing out principally what a real organization can accomplish by co-operation. The speaker won the hearts of his hearers by making the statement that he personally was for well conducted trolley service, and positively was against the jitney business. He also suggested a loop system for Camden, whereby the citizens in new sections would have convenient transportation rather than having to walk a number of squares to the nearest car line.

In the general discussion which followed, improvement in the service was the chief topic. Some interesting matters were brought to light, chief among them being the smoking nuisance on trolley cars.

Mr. Schreiber wound up the evening talk by stating that the general public should be impartial in its judgment of the trolleys. Without such services in the various suburban towns these towns could not advance, and should a receivership for the Public Service Railway become necessary, patrons would be obliged to pay additional fares to travel to the very communities that are now covered by single fares. Mr. Schreiber also read numerous letters that he had received complimenting the railway on its good service.

Commerce Chamber Meets

THERE was a large attendance at the meetings of the United States Chamber of Commerce, held at Atlantic City this week. The first general session was on Wednesday morning. This was followed by similar sessions on Thursday morning and Friday morning and afternoon, with group meetings on the afternoons of Wednesday and Thursday. Two special topics considered by each group were taxation and tariff.

The situation of the public utilities was considered in a paper by Edward N. Hurley of Chicago, entitled "The Arrested Development of Public Utilities," scheduled for presentation at the general session on Friday morning. The report of the directors of the organization on the work of the past year also contained a reference to Referendum No. 33 on electric railways, submitted Nov. 19, 1920, with the vote recorded on each of the eight propositions presented to the membership. The report of the committee on railroads, presented before the Transportation and Communications Group, was devoted to the trunk line railroad question and did not recommend additional legislation on the railroad question at the present time. Instead, it expressed the opinion that there should be further experience under the transportation act of 1920.

Connecticut Section A. I. E. E. Organized

THE thirty-second local section of the American Institute of Electrical Engineers was formally organized at New Haven, Conn., on April 22. It will be known as the Connecticut Section. The section will include all of Connecticut, with the possible exception of the corners of the State now within the radius of the New York, Pittsfield and Providence Sections and will have meetings at various points in the state.

The principal speaker at the organization dinner was Dr. William McClellan, leading candidate for the institute presidency for the coming year. He made a plea for the recognition by the section of its duty to develop a broad engineering atmosphere as well as to discuss technical engineering problems.

Charles F. Scott, professor of electrical engineering Yale University, was elected chairman of the section, and A. E. Knowlton, electrical engineer Public Utilities Commission of Connecticut and instructor in electrical engineering Yale University, secretary-treasurer.

French Electrification Progress

THE French Commission in the United States has recently issued a statement regarding progress which is being made in adapting electric motive power to heavy railroading in France. Electrification of more than 1,800 miles of track is under way, orders having been placed for fifty new electric locomotives of a type somewhat similar to that used by the Milwaukee Railway in this country. Two hydro-electric plants are being reconstructed, each to furnish 150,000 hp. to this railway, and this work is nearly complete.

The Orleans Company and the Paris-Lyons-Mediterranean Railway are planning to electrify about the same length of track. Electric power for the former will be furnished by the waterfalls of the Upper Dordogne River, while that for the "P. L. M." will come from the falls in the French Alps. The cost of electrifying all of these roads will be at least 5,000,000,000 francs and electrification is expected to save more than 3,000,000 tons of coal per annum.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wage Cut Rejected

Arbitration May, However, Be Resorted to in Detroit Controversy—Men Name Representative

The proposed reduction of wages suggested by the Detroit (Mich.) United Railway to become effective on May 1 has been rejected by the men. No agreement has been reached relative to arbitration. The men have, however, asked for a conference with officers of the company, with a view to discussing and considering the situation in the hope of being able to reach an understanding on the agreement covering wages and working conditions or to arrange to submit the questions to arbitration if an understanding could not be reached. A resolution passed by the men in mass meeting requested that the old contract be continued, with the wages and working conditions unchanged.

It was further resolved that should the joint committee and the officials of the company fail to reach a satisfactory settlement before May 1, 1921, the company should be notified that an arbitrary reduction in wages and change in working conditions will not be accepted.

A conference between the representatives of the union and company officials did not bring any definite results. While the company is willing to consider arbitrating the entire agreement with employees, arbitration of the wage question alone is not looked upon with favor by the company.

In a letter sent to Frank W. Brooks, president of the company, the joint committee states that there appears to be either an oversight or misunderstanding on the part of the company as to the time the present wage went into effect. While the company officials seem to be under the impression that the present wage went into effect on May 1, 1920, the men contend that the present rate did not go into effect until May 16, 1920, and that it was to be for one year.

As a basis of settlement for wages and other questions in dispute as submitted in the company's proposed agreement the committee makes the following proposition:

> That these questions should be submitted to a board of arbitration of three persons as the agreement provides and the decision of a majority of the board of arbitration to be final and binding upon both parties.
>
> That the present wage rate and working condition continue in effect until the board of arbitrators have made their award.
>
> That should the time of the board of arbitration extend beyond May 16 the arbitration board be empowered to say whether any decrease or increase which they may award shall be retroactive.
>
> That should there be an increase the company is to pay the same from May 16, 1921; if there be a decrease the decrease is to be taken from the wage of the employee from May 16, 1921, and in order to assure the company against any loss in case where an employee might leave the service of the company before the company had the opportunity to deduct any decrease the organization will place in the hands of the Peoples State Bank of Detroit, Mich., the sum of $50,000 to meet any such shortage.

For the purpose of completing and getting the arbitration board into operation the committee has named Frank D. Eaman as arbitrator for the men.

Following the conference with the men President Brooks issued a statement in which it was cited that representatives of the employees had been advised of the financial inability of the company to continue the present wartime wages on the existing rates of fare and that the necessity had been made clear for a wage readjustment on May 1 to meet existing conditions.

As to the matter of arbitration Mr. Brooks explained that the company now, as always, stood ready to submit all differences to the judgment and decision of such a board, and that if the offer the company has made is not acceptable then the company is willing to submit the entire agreement to a board of arbitration and pending the decision the rates of pay and working conditions offered by the company are to be put into effect on May 1, in accordance with the notice to the men.

Cost-Plus System Favored

The Fort Wayne Federation of Labor has expressed a preference for the cost-plus system of determining fares for the city lines in Fort Wayne and a resolution setting forth the federation's position in the matter has been presented to the City Council, as follows:

> The federation's committee appointed to investigate the railway situation has decided to ask the federation to endorse the cost-plus plan of railway operation and to ask the City Council to appoint a committee to confer with this committee to study the possibility of installing such a plan in Fort Wayne.
>
> Your committee is well aware that the company is entitled to a fair and just return on the money actually invested and no more. On the other hand, the citizens are entitled to a first-class service at as low a cost as is possible. We believe that the cost-plus plan if properly installed will meet the purposes.

In his statement giving the reasons for asking for a rehearing the city attorney alludes to the matter of maintenance.

"The city of Fort Wayne is desirous that proper service be maintained, but it believes it unjust to do an abnormal amount of maintenance work, rebuilding of lines and such in a very short time, thus taxing the present car riders more than their just burden to satisfy the desire of the present operator to get his Fort Wayne lines in the very best possible condition at the earliest possible moment."

Investigation in Boston

Outside Influence Shown to Be Negligible in Effecting Passage of Public Control Acts

The investigating committee of the Massachusetts Legislature, recently appointed to look into charges of irregularities alleged to have existed in connection with the passage of street railway legislation in 1918 and 1919, has been engaged in questioning the men who were members of the two houses during those years. The committee has appointed George S. Taft, former district attorney of Worcester County, to act as counsel. The committee itself consists of five members of the present Legislature, none of whom was connected with that body in 1918.

At present all testimony is voluntary, each former legislator being called upon to waive his immunity rights before testifying. All witnesses are duly sworn before giving testimony. Only two have so far refused to testify voluntarily.

GOVERNOR COX A WITNESS

Among those who have appeared before the committee is Channing H. Cox, now Governor of the State. Governor Cox was a prominent member of the 1918 Legislature, being speaker of the House of Representatives at that time. He upheld the street railway relief legislation as it was enacted at that time, and had no apologies to offer for it. He testified that he knew of no irregularities or improper influences exerted on legislators in behalf of the street railway bills.

There is some indication that an attempt will be made to invite Vice-President Calvin Coolidge, former Governor of Massachusetts, to come before the committee.

Several members of the former Legislature have admitted having purchased stock of the Boston Elevated and Massachusetts Electric companies, anticipating a probable rise in market value of those securities upon the passage of the public control and other favorable legislation. The ranks of the speculators included some legislators who opposed the bills and voted against them. In general they maintain that they believed they had a perfect right as individuals to do so, claiming their votes were not influenced thereby.

Each witness is first asked a series of specific questions designed to bring out whether or not any improper influence was brought to bear on him or whether any inducement was offered to secure votes in favor of the legislation. Each witness is also asked whether he bought any securities of the street railways involved, either directly themselves, or indirectly through others.

Although a few above mentioned admitted having speculated in the stock, all have denied any improper influence or inducement. Some have claimed that strong political pressure was brought to bear, and one or two have mentioned "corridor gossip" involving the possible financial advantage to be gained by speculating in the stock, but no specific names or concrete facts have been given of any irregular influences.

Following the standard interrogatories of counsel, each man is given an opportunity to make any informal statement he may desire. A number have taken the opportunity to praise the legislation, especially the Boston Elevated public control act, and have classed it as one of the most popular and cleanest pieces of corporation legislation ever passed.

The Boston daily papers, with the exception of the newly-established *Boston Telegram*, do not seem to take the present investigation very seriously. While fully reporting it in the news columns, very little editorial comment has been aroused. The Boston papers were unanimously in favor of the public control act in 1918.

Some little resentment has been aroused in banking and financial circles because of the action of the committee in sending an auditor to examine into their books and records of customers' transactions.

The committee's counsel, Mr. Taft, has given as his opinion that the Boston Elevated public control act is in the nature of a contract between the State and the Elevated Railway stockholders, and has hinted that legislators who owned stock and voted on the legislation relating to this alleged contract are liable to prosecution under the laws of the Commonwealth.

New Franchise in Effect

Details Are Reviewed of Outstanding Provisions of New Service-at-Cost Grant at Findlay

The new service-at-cost franchise for the city lines of the Toledo, Bowling Green & Southern Traction Company at Findlay, Ohio, went into effect on March 17. Fares are now 8 cents. C. E. Hart, D. Fortflowers, and M. D. Neff have been named by the City Council as the members of the first street railway commission. They will have power under the ordinance to regulate the service and determine when fare increases or decreases shall take effect under the new plan. The service and safety director of the city has since been named street railway director.

THE new service-at-cost franchise accepted on Feb. 14 by the Toledo, Bowling Green & Southern Traction Company modifies the twenty-five-year franchise in Findlay granted on Feb. 23, 1915. The franchise contains a number of interesting features.

One of these covers the appointment of the Commission of Control. This body is to consist of three members, each elected for a term of three years. The commissioners serve without pay. The Mayor transmits to the Council a list containing twice as many names as places to be filled, and from this list the Council fills the vacancies. The control of the service is in the hands of this commission except that it is not permitted to make "such requirements as will prevent the production of sufficient revenue to maintain the stablizing account."

Moreover, the commissioners have no control over temporary or emergency measures that may be taken by the company, and they work through the present city official known as the director of public service, who receives no extra compensation for the added responsibility but can employ necessary assistants at the expense of the railway.

Section 5 provides that the "traction company," which includes the interurban lines, shall pay 0.45 cents per ton car mile to the city street railway for the use of the track by the interurban passenger and freight motor cars and trailers in addition to a power charge.

Funds derived from the sale of property and not applied to the payment or retirement of outstanding bond issues may be used for extensions, betterments of permanent railway improvements, provided it is so agreed by the traction company, the trustee for the bondholders and the commission, but no additions are to be made to capital value for extensions, improvements and betterments so required. These funds may also be used for the renewal of existing equipment or property. If funds received from such a sale are not used for improvements of the property the capital value of the city street railway is to be reduced proportionately.

Section 10 provides that the value of the physical property of the city railway be set at $180,000 and on this amount the company is permitted a return of 7 per cent.

Section 11 provides for the stabilizing account which is to be $20,000, less prepaid accounts on the books of the city street railway, and this sum is recognized as part of the capitalization of the city street railway.

Section 12 provides that the traction company shall receive an allowance of 15 cents per car mile for operating expenses such as power, insurance, payment of claims, overhead expenses proportionate to the service, etc. The operating allowance is also to include not more than $400 a month to the traction company for joint services such as executive salaries and rental expense. These joint charges are not to be in excess of 12 per cent of the total operating allowance for any one month.

Section 13 provides for an additional allowance of 3½ cents per car mile exclusive of the car miles traveled by work cars for maintenance, which will be used exclusively for the upkeep of the city street railway property. In addition there is an allowance of 3 per cent of the capital value of the property (less land value and stabilizing account) for renewal and depreciation allowance. Such allowance cannot be used to make improvements which can be capitalized.

There is a sliding scale of fares, beginning at 8 cents cash, fourteen tickets for a dollar, or seven tickets for 50 cents. Increases or decreases are made according to regular schedule when the $20,000 stabilizing fund reaches $25,000 or drops to $15,000.

In case the traction company fails to carry out the conditions of the franchise after thirty days' written notice the commission can take over the street railway property and operate it until the traction company complies with the terms of the ordinance. During the time the city operates the railway all net income after paying current operating and maintenance charges are to be credited to the stabilizing account.

City Attacks New Law

An order was obtained on April 25 by the City of New York in the Supreme Court for the new Transit Commissioners of New York to show cause why they should not be restrained from entering upon their new duties and that the present Transit Construction Commissioner should show why he should not be restrained from turning over to the new body the records of the commissioner's office. The new commission in New York City has since taken charge over the protest of Rapid Transit Construction Commissioner Delaney.

Jitney Operators Arrested

The police of Albany, N. Y., under the direction of Public Safety Commissioner Frost, on April 22, started making wholesale arrests of jitney bus operators. All of those arraigned demanded jury trials, were admitted to bail and in many instances resumed operation of their cars.

The situation is a peculiar one in that Mayor Watt has recently been served with an injunction restraining the operation of jitneys in competition with the United Traction Company's cars and has made an appeal on the injunction. Corporation Counsel McManus holds the Mayor without authority to stop jitney service pending the result of the appeal, but the Commissioner of Public Safety has gone over the Mayor's head in the exercise of the police power to stop the service.

In spite of the fact the railway states the strike of its trainmen is broken Justice Hinman of the Supreme Court on April 21 ruled that the ban against picketing by former employees of the United Traction Company be continued.

For the first time since the strike began twelve weeks ago service was resumed by the United Traction Company in Rensselaer on April 22.

Interurban Announces Wage Cut

Wages of motormen and conductors employed by the Cleveland, Columbus & Southwestern Railway, an interurban road that taps territory southwest of Cleveland, are to be reduced on May 1, officials of the company have just announced.

The exact amount of the reduction has not been definitely determined but officials have stated that the financial conditions of the road makes it necessary to reduce the wages of the trainmen at least 20 per cent. This is the amount of the reduction accepted by the local Cleveland trainmen.

The wages paid by the Cleveland, Columbus & Southwestern Railway now are 55 cents an hour for first three months; 58 cents an hour for the next nine months and 60 cents an hour for all men in the service longer than one year. It is likely that the highest rate the men will receive after May 1 will be 48 cents an hour.

Changes in Proposed Florida Bill

With ten Florida cities represented by their mayor or some other high official protesting vigorously and presenting protests from fifty other communities the Railroad Commission has decided it will not press its bill for the creating of a Florida public utilities commission in its present form and that the clause giving the proposed commission control over municipally owned public utilities will be stricken from the proposed measure. The announcement was made by the commission's chairman, R. Hudson Burr, after a hearing of one hour on the bill by the Senate committee to which it had been referred by the Senate now in session at Tallahassee, Fla.

The proposed bill would create a public utilities commission to take over the duties of the present Railroad Commission and to take control of all public utilities such as electric, gas, water plants, etc. It was drawn by the Railroad Commission, presented by its attorney, who is a state Senator, and was referred to a committee of which the attorney was a member. This series of circumstances has heightened the hue and cry against the measure.

Peter O. Knight, general counsel for Stone & Webster in the Florida district, has expressed himself as follows:

> I have become convinced that regulation of public utilities has come to stay. I know when I'm licked; and if we have to have regulation the companies I represent want intelligent regulation by an efficient body that can demand and enforce its demands. We do not want picayunish political regulation as inconsistent as the wind of hot-air politicians. We want what we are entitled to and that's all. I am not particularly in favor of this bill but I am not fighting it. We are willing to accept it as preferable to political regulation, that's all.

$1,700,000 for Rapid Transit Changes in Queens

The problem of how to operate trains of the Interborough Rapid Transit Company and Brooklyn Rapid Transit Company with cars of different width over the same tracks in Queens Borough, New York City, has been solved by Transit Construction Commissioner John H. Delaney. Double rails will be laid, the Interborough using those already placed and the Brooklyn Rapid Transit trains to use those to be laid immediately. The double rails will make necessary some minor changes in equipment.

The tracks were laid by the Interborough Company, which uses cars about 12 in. narrower than those of the Brooklyn Rapid Transit Company. The Interborough refused to spend money to make changes for the accommodation of a rival, even though the contract called for dual operation. Commissioner Delaney ordered the company to make the changes and the courts were appealed to. The litigation resulted in a victory for the Interborough. Mr. Delaney on April 9 said that 16 miles of single track would be affected, and he estimated the cost of track changes at $800,000. Independent signaling and third-rail service will cost $300,000 more, and the cost of structural changes at the various stations on the new line in Queens is estimated at $600,000.

Commission's Powers Widened

Authority of Minnesota Body Extended to Electric Railway Rates, but Cities Control Service

General satisfaction exists in cities in Minnesota that have electric railways over the final passage of the amended street railway bill by the Minnesota Legislature and its signature by Governor J. A. O. Preus. The bill passed the House on April 13 by a vote of sixty-nine to fifty-seven. The amended bill passed the Senate on April 14, when the body concurred in the House amendments. It was signed by the Governor on April 16.

UNDER the new law rate control is vested in the State Railroad & Warehouse Commission with jurisdiction to the cities over routings and extensions. The commission is authorized to establish an emergency increase before a revaluation can be made and a permanent rate established.

The law settles the status of franchises soon to expire in the various cities by providing for the new indeterminate franchise method. The measure is on this account expected to stabilize business and to assist the companies in arranging new financing.

Not the least of the benefits will be to remove the question of fares from city councils and place it in the hands of a commission which is expert in the matter of rates and of valuations. However, the right of the cities to appeal to the courts under proper circumstances is reserved, as well as all local matters pertaining to new lines, etc., thus leaving intact the cities' home rule.

The railway lines in both Minneapolis and St. Paul are operating at a 6-cent fare. In Minneapolis the Twin City Rapid Transit Company already had authority to increase the fare to 7 cents, and in St. Paul to 7 cents after the Council had determined whether the railway has established service previously agreed upon as being necessary.

A summary of the provisions of the bill follows:

Section 1. Defines terms used in the bill.

Section 2. Provides that existing grants to street railways of the state and those made in the future shall be indeterminate permits—permits to do business until purchase of the property by the city or until termination or modification of these permits by the legislature. Acceptance of the indeterminate grant by companies now operating is optional, however. All terms, conditions and obligations of existing franchises are continued in force except as otherwise provided in the bill.

Section 3. Provides for purchase of the company's property by the city at a valuation fixed by the commission, whose decision in the matter is subject to appeal to the District Court of the county in which the company operates. This property may, moreover, be acquired by condemnation proceedings, or by agreement.

Section 4. Perpetuates the right of the cities to say what manner of service the street railways must furnish. This authority is made final and is not subject to appeal by the street railway.

Section 5. Grants the Railroad and Warehouse Commission authority to fix reasonable rates of fare, subject to appeal to the District Court of the county in which the company operates.

Section 6. Provides more particularly for continuous intercity passenger service, having in mind more particularly the peculiar situation which exists because of the physical proximity of Minneapolis and St. Paul.

Section 7. Provides that the company must obtain authority of the commission before it can issue stocks, bonds or other evidences of indebtedness payable at periods of more than one year, and further provides that the street railway shall not issue evidences of indebtedness when their value, together with other outstanding securities exceeds the fair value of the property. This makes watered stock impossible.

Section 8. Gives the commission authority to establish rates of fare, either on its own initiative or on the application of either the city or the street railway, and provides that such rate shall be based on a valuation of the street railway's property. This section further provides that the commission shall have access at all times to the records and accounts of the street railways.

Section 9. Authorizes the commission to determine and fix the fair value of the street railway if the petition of the city be filed with the intention of acquiring such property. If the petition be to fix a rate of fare, the commission is to allow a rate which will yield only a reasonable return on the fair value of the property.

Section 10. Provides that the city or street railway may appeal to the District Court of the county in which the street railway operates from any ruling of the commission, and that the court shall try the case *de novo*, taking into consideration any evidence offered, whether excluded by the commission or not. An appeal from the decision of the District Court may be taken to the Supreme Court.

Section 11. Provides for use of city lines by suburban railway. The compensation to be paid is to be fixed by mutual agreement if possible, subject to the approval of the Council, but in the event of the failure to agree the Council is to fix the compensation, subject to appeal to the District Court.

> Section 12. Declares that no grant shall be issued to a street railway to operate in a city in which another street railway is then operating unless a certificate of convenience and necessity is first obtained from the commission after a hearing.
>
> Section 13. Vests in the commission the authority to prescribe a system of accounting, prescribe depreciation, and control the disposition of money in the depreciation fund. This section compels the company to furnish the commission annually full financial reports, and any additional reports that the commission may request.
>
> Section 14. Reserves to the state the right to modify, amend or repeal the act, or to cancel or modify any indeterminate permit. It prohibits the granting of an indeterminate permit to other than a Minnesota corporation.
>
> Section 15. Repeals all legislation conflicting with the provisions of the act.
>
> Section 16. Makes the act effective from and after its passage.

Formal acceptance of the provisions of the new law was sanctioned by the directors of the Twin City Rapid Transit Company on April 22. President Horace Lowry said:

> The board decided to accept the indeterminate permit as provided by the law, and to work under the new act. As to the service in the Twin Cities there will be no immediate effect except that we will continue our efforts to improve the service. Details of changes will have to be worked out.

In commenting on the act when it passed Mr. Lowry said:

> I am glad the Legislature has seen fit to pass a law which will strengthen the credit of street railways and will, I hope, enable our companies to obtain the funds necessary to build up and expand our system of transportation to meet the needs of these growing cities and the surrounding country.
>
> The public, however, must realize that under the act it will take the commission some little time to determine the fair value of the property and that this must be done before we can ask the investing public to lend us the money we need to do even the work and paving now ordered.
>
> The company, through its officers, during the discussion of the bill pledged itself to do its best to go forward in the public interest. The passage of this act increases the responsibility of the company to the car riding public, and at this time I wish to assure our patrons that we propose to the best of our ability in letter and spirit to live up to all that we have promised.

The exact date for filing of declarations with the city clerk is not determined. The certificates which the clerks will issue, when filed with the Secretary of State, place the companies under the indeterminate franchises provided for in the new law.

Strike Likely on Eastern Massachusetts Street Railway

Unless some unexpected eleventh hour development occurs to change their plans, the employees of the Eastern Massachusetts Street Railway are expected to go on strike on May 2. According to figures given out by the union officials, the men voted overwhelmingly against accepting either of the alternative propositions offered by the public trustees. The latter on Feb. 25 announced a 20 per cent reduction in wages, effective May 2, the union contract expiring May 1, and since then, as an alternative, have offered to arbitrate the wage question, but only on condition that an open shop policy will be followed. Neither of these was acceptable to the union.

The men are demanding arbitration on the basis of possible changes in the existing agreement. The trustees, however, in their original notice to the employees, signified their intention to cancel in its entirety the present union agreement at its expiration, May 1.

The trustees have announced that they intend to operate the road whether or not the present employees quit.

The trustees have sent announcements to the public officials and the newspapers in the various cities and towns that their intentions in reducing wages are solely along the lines of making reductions in car fares, and that the company does not expect to profit by lower wages.

Advantageous Advertising Contract

United Railways, St. Louis, Will Increase Revenue 300 per Cent Under New Arrangement

In letting a contract to the Western Advertising Company for space on and in the cars of the United Railways, St. Louis, Mo., beginning on Oct. 1, 1921, Rolla Wells, receiver, has included the dashboard space which heretofore has been reserved by the railway for civic and charity purposes, or used to stimulate travel. This increased space was a factor in the 300 per cent increase in revenue the company will gain from the new advertising contract.

$191,300 FOR TEN YEARS

The contract is for ten years at $191,300 a year. When the receiver took charge two years ago, the company was receiving $64,000 annually for advertising space. Last year this sum was raised to $80,000, under a temporary settlement effected in the United States Circuit Court. Last month, by order of the court, new bids were called for and they were opened a few days ago. There were four bids, and the minimum under the new allotment of space including dashboards was $150,000.

Separate bids for inside and outside the cars were not called for, and therefore no indication was given as to how much the bidders considered the dashboard space to be worth—two dashboards on the fronts of all the 1,500 cars operated by the company. The periods of time called for were five and ten years, and it was found that the Western Advertising Company, the highest bidder, offered $10,000 a year more for a ten-year contract than a five-year contract. The receiver accepted the ten-year agreement, $191,300 annually, and it is expected the Federal Court will approve it.

RAILWAY RESERVED LITTLE SPACE

The only space reserved by the company for its own purposes is the lightbox sign space, and on the glass of the windows when the windows are closed. The company's publicity will take some other form, and Col. A. T. Perkins, manager for the receiver, is now considering the publication and distribution of folders for car riders. It is figured that 500,000 folders can be printed and distributed every month for about 4 per cent of the increased revenue the company gets for the advertising space.

Wage Cut Demanded

Railway at Youngstown Insists Upon 25 per Cent Reduction and Changes in Working Conditions

G. T. Seely, vice-president and general manager of the Pennsylvania-Ohio Electric Company and president of the Youngstown Municipal Railway, has transmitted to the trainmen in the employ of these companies a draft of a new agreement for the ensuing year embodying a wage scale of 45 cents an hour for the first three months, 48 cents for the next nine months and 50 cents an hour thereafter, with 5 cents an hour additional for operators of one-man cars.

The present contract governing the wages and working conditions of the trainmen has been in force since April 1, 1920. It expires May 31, 1921.

TWENTY-FIVE PER CENT REDUCTION

The rates of wage paid under this contract are 60 cents an hour for the first three months of employment, 63 cents an hour for the next nine months and 68 cents an hour thereafter, and 5 cents an hour additional for operators of safety cars. By far the largest number of men come under the higher classifications. The rates of wage in the last previous contract were 43 cents an hour for the first three months, 46 cents an hour for the next nine months and 48 cents an hour thereafter. The rates in the present contract are more than 40 per cent above those specified in the last previous contract and 120 per cent greater than the rates of wage paid in 1914 prior to the beginning of the world war.

Mr. Seely explains to the men that after a year's experience with the present scale, it has been conclusively demonstrated that this rate of wage cannot be continued as the earnings are not sufficient properly to maintain the property or provide any return on the investment. Mr. Seely says that the only excuse for such an intolerable condition being permitted to exist temporarily was the excessively high cost of living in effect in April, 1920, when the last contract was negotiated. In this connection he says:

> Now that the cost of living has materially declined, this temporary situation no longer exists and the public interest requires an adjustment; and I am, therefore, taking this opportunity to inform you that this company cannot continue the present wage agreement beyond the date fixed therein, May 31, 1921, and that any new wage agreement must of necessity be much lower than the present wage in all rates.

At the same time Mr. Seely has explained that some of the working conditions under the present contract are a survival of years when different operating conditions existed and are of such a nature as to interfere with efficient operation. He says that the conditions which should be modified or eliminated are those—

> 1. Requiring and enforcing absolute closed shop and interfering with free selection of men.
>
> 2. Requiring all runs to be early and late—a situation which renders operation costly and inefficient.
>
> 3. Requiring unnecessary expenditures

for pilots to accompany crews already familiar with road.

4. Requiring higher rates of wages for certain work that would be largely sought by trainmen at standard rates.

5. Requiring excessive penalty payments for overtime.

6. Prohibiting operation of safety cars on lines on which special agreement has been made, thus tending to limit the company in providing adequate service to the public.

Cars Reflect Europe's Devastation

A recent traveler through after-the-war Europe has brought back to this country harrowing tales of the electric railway industry in Budapest. He says:

> As for the street cars, I never saw such woe-begone specimens as those of Budapest. They used to be brown or yellow, but now nearly every one of them is a nondescrpt blackish-gray, a color without a name. Their wheels and the rest of their machinery are so rusty that the poor cars wheeze and creak and groan as if they were about to fall to pieces any minute. Their windows won't work; the platform steps sag when one puts a foot on them. As these faded imitations of trolley cars jolt along Budapest's dirty thoroughfares they seem like mangy street curs sneaking along the gutters in search of a bone.

Some Contemporaries of the Five-Cent Fare

Nelson, Cook & Company, Baltimore, Md., in their market letter of April, comment upon the agitation for a restoration of the 5-cent fare in that city. They say:

> Now is not the time to restore the old 5-cent fare, nor would it be feasible for the city of Baltimore even if the proposition were considered a good one, to take advantage of the old agreement contained in the original franchises whereby the city has the privilege at given periods of purchasing the old City Passenger Railway lines. The return of the 5-cent carfare will be contemporaneous with the return of the 1-cent newspaper, the $4 a day mechanic, the $10 a week stenographer, and similar quotations of a former day.

News Notes

Carmen Suggest Wage Cut.—The manager of the Altoona & Logan Valley Electric Railway, Altoona, Pa., has been notified that the employees will voluntarily accept a wage reduction of 5 cents an hour beginning May 1. The scale has been 55, 57½ and 60 cents, according to length of service.

Wage Offer Rejected.—Employees of the Des Moines (Ia.) City Railway, by an overwhelming vote, have rejected the proposition submited by the company which placed the maximum wage at 60 cents. The present working agreement between the men and the company expired on March 1. If an agreement cannot be reached the wage question will be submitted to arbitration.

Plans Study of Trackless Trolley.—An investigation of the feasibility of installing the trackless trolley in Cincinnati, Ohio, was started by William C. Culkins, formerly director of street railways. Mr. Culkins said that the trackless trolley might be very useful and successful in parts of the city where extensions of the railway are really needed but where the expense of installing such railway extensions would be prohibitive.

Sioux City Men Face Wage Cut.—Sufficient revenue has not been obtained by Sioux City (Ia.) Service Company from fare granted last year to maintain the present wage scale and a readjustment has been asked. The men were granted an increase last year, making the hourly scale 50 to 60 cents with 7 cents additional per hour for operating one-man cars. It is intimated that a 10 per cent reduction will be asked.

Safety and Courtesy Win Merit.—To place special emphasis on safety and courtesy the Los Angeles (Cal.) Railway has announced a slight change in the merit system, under which credits are computed for the Christmas cash bonus. The 25 credits formerly given for a clear record for one month will be discontinued and instead, regardless of the number of demerits which a man has received for other reasons, ten credits will be given monthly to each man who maintains a clear courtesy record for one month and ten credits to each man who maintains a clear safety record for each month.

Municipalization Urged.—A large delegation from Niagara Falls, St. Catharines and other surrounding municipalities waited on J. D. Reid, Minister of Railways and Canals in the Dominion Government, recently to request the Government to acceede to the immediate purchase of the Niagara, St. Catharines & Toronto Railway by the Niagara Radial Railway Union. In reply Dr. Reid stated that it was impossible to take any action pending the report of the Royal (Sutherland) Commission appointed by the Ontario Government and which is now investigating the whole question of Hydro Radials within the province of Ontario.

No Progress Made on Toledo Agreement.—The possibility of a strike of trainmen of the Toledo Railways & Light Company, Toledo, Ohio, has been hinted by the union men, who are now working without any contract covering working conditions or wages. At the expiration of the contract nearly a month ago negotiations were begun looking toward a new agreement but no progress has been made. The company proposed a slight reduction in wages, but the men turned the contract down and have not made any compromise offer. In view of the deficits in the operation of the Community Traction system it is almost a certainty that the street railway commissioner will ask for a reduction of wages as an effort to forestall an advance in fares in August.

Nine-Cent Wage Increase Asked.—Employees of the Syracuse & Suburban Railroad, Syracuse, N. Y., which since its resumption a month ago has been operating one-man cars, have taken the initiative with respect to a contract to replace the present agreement, which expires on May 1. They have submitted a new contract calling for a wage increase from 56 cents an hour, the present scale, to 65 cents, basing their demand on the increased difficulty of operation of the one-man cars. The present contract was negotiated last May as the result of a strike. After the road suspended operation on Jan. 1 of this year General Manager Allen declared that the shut-down canceled the contract, and if the road resumed it would pay the men only 42 cents an hour, a reduction of 25 per cent. It was later decided to continue the scale in effect for two-man cars to the one-man car operators until the expiration of the contract.

Glasgow Against Underground Lines.—In reference to the great congestion of street traffic in the center of Glasgow, James Dalrymple, general manager of tramways, reported early in March to a committee of the Town Council against the construction of elevated or underground electric railways on account of the enormous capital cost and because the traffic would not yield sufficient revenue to meet the working expenses. What was needed, he said, was two additional bridges across the Clyde. The committee is recommending the construction of one of the proposed bridges with tramways on it, half the cost to be paid by the tramway department. The bridge and the necessary land are estimated to cost £840,000. For linking together outlying districts, where the present cost of tramway construction would be too high, Mr. Dalrymple favored the trackless trolley system of cars which could be worked much more cheaply than petrol motor omnibuses.

Objection Raised to Norfolk Grant.—At a recent public hearing before the City Council of Norfolk, Va., Tazewell Taylor, retained as special counsel by the Retail Merchants' Association in connection with the proposed new railway franchise for the Virginia Railway & Power Company, sharply criticised the franchise draft largely the work of A. Merritt Taylor, Philadelphia. He also entered objections to the provision for a utility board and for an 8 per cent return through a thirty-year franchise. He further attacked the idea of the city's pledging itself to renew the franchise or buy the property at the end of thirty years. Mr. Taylor believed that an examination of the company's books by the city would enable the city to fix a fare that would give a "just and fair return on the actual investment." The Norfolk Chamber of Commerce has retained Delos F. Wilcox, New York, as its adviser. A report by him on the pending franchise is expected within a few weeks.

Meeting of Association

New York Electric Railway Association

The thirty-ninth annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, N. Y., on Saturday, June 11.

Financial and Corporate

Call for Columbus Briefs

Special Master Hearing Charges of Mismanagement Expected to Report Soon

After months of intermittent hearings attorneys for the Columbus Railway, Power & Light Company, Columbus, Ohio, and for E. W. Clark & Company, Philadelphia, respectively, have closed their arguments and the master commissioner who has been hearing the testimony has asked for the filing of briefs by both sides in the controversy between the two interests.

The litigation arose through the filing of the Slaymaker receivership suit many months ago, brought by a stockholder to compel an accounting and if possible precipitate a receivership. Into this situation attorneys for the Columbus Railway, Power & Light Company injected evidence tending to place the blame for the alleged mismanagement of the company on the Clark interests, engineering and financial agents for the railway for years.

Charges were made at the hearings that the Clark company realized a large profit for handling the bonds and notes of the Columbus company, while at the same time it was receiving fees for acting as its agent. An analysis of the Clark company's records was introduced by the rail-light attorneys covering various transactions. In one instance alone, that of Feb. 1, 1916, it was sought to show E. W. Clark & Company received from the rail-light company $3,500,000 in bonds, at 90 per cent of par, or $3,150,000, and that the Clark company within ten days made a profit of $82,557 on the bonds.

This record, attorneys for the company contend, bears out the charge made by Charles L. Kurtz, president of the company, that at the time the bonds were disposed of a much better price than 90 could have been secured by the company. One million dollars of bonds issued on May 3, 1917, are alleged to have gone through a somewhat similar procedure, despite objections raised by Mr. Kurtz, then merely a stockholder.

Further testimony was adduced to the effect that cash vouchers for money drawn by E. K. Stewart, general manager and treasurer of the Columbus company during the Clark alliance, were unsupported by any accompanying papers.

Documentary evidence was also introduced by Attorney Edward C. Turner, counsel for the rail-light company, purporting to show that the Clark company drew labor and construction fees totaling $165,075, in connection with the building of power stations. Mr. Turner contended that the Clark company was not entitled to these fees in addition to what it was already receiving. He also held improper a discount of $86,000 taken by the Clark company on securities handled by it.

It was testified in connection with the reorganization of the railway in 1919, after the court had threatened to appoint a receiver unless a new management should be provided, that Mr. Stewart refused to vote either for the ousting of the Clark interests or for any new official or director. Two other directors who voted against a change switched their votes later but Mr. Stewart held out, it was testified.

Master Commissioner George B. Okey, in charge of the case, may not report his findings for some time.

$152,119,927 of Securities Authorized

During the twelve months ended Dec. 31, 1920, California utilities filed with the Railroad Commission applications to issue securities that aggregated $179,668,083. The commission approved applications to the extent of $152,119,927, denied applications totaling $250,500, dismissed requests aggregating $3,491,560 and on Dec. 31 had pending applications totaling $50,678,783. In only two years since the effective date of the Public Utilities act, March 23, 1912, has the amount of securities authorized by the commission in 1920 been exceeded. In 1914 the commission authorized $226,725,501 and in 1916 $186,633,146. In 1919 the issues amounted to $72,774,902. Since March 23, 1912, the grand total of securities authorized by the commission amounts to $1,084,560,452.

Permission to issue securities was obtained by the several classes of utilities as follows:

	Twelve Months Ended Dec. 31, 1920	Twelve Months Ended Dec. 31, 1919
Steam railroads	$4,523,354	$4,812,811
Electric railways	46,434,279	8,867,562
Gas and electric companies	82,515,708	56,095,461
Water companies	12,215,650	1,445,831
Telephone and telegraph companies	2,990,755	161,390
Warehouse companies	401,050	634,200
Paper companies	....	....
Pipe line companies	....	....
Steamship companies	14,100	540,340
Motor companies	3,025,031	217,305
Total	$152,119,927	$72,774,902

The securities authorized to be issued were for the following purposes:

Purpose	Twelve Months Ended Dec. 31, 1920	Twelve Months Ended Dec. 31, 1919
To install additions and betterments	$73,045,192	$43,708.588
To refund indebtedness	3,508,460	18.526 152
To be used for collateral	29,580 000	797.000
For reorganization purposes	43,594,500	9 743.162
For miscellaneous purposes	2,391 775	....
Total	$152,119,927	$72,774,902

Bondholders' Status Fixed

Holders of Underlying Securities Benefit by Ruling of Court of Appeals of Ohio

Holders of the underlying bonds of the former Cincinnati, Dayton & Toledo Traction Company's system between Cincinnati and Dayton, Ohio, benefit by a decision handed down by the Court of Appeals at Cincinnati, Ohio, in a case which came up from the Butler County Courts. The decision written by Judge Wade Cushing and concurred in by Judges F. M. Hamilton and Robert Z. Buchwalter gives these mortgagees rights in a $500,000 power plant near Hamilton built by the Cincinnati Traction Company.

The Cincinnati, Dayton & Toledo Traction Company was formed by consolidating six separate companies which operated portions of what later became the single traction line. The Butler County Common Pleas Court ruled against the holders of the bonds of these companies upon their claims against the power house, and they appealed to the Court of Appeals. That body now holds that the underlying bondholders or mortgagees are entitled to have their rights restored to the condition they were in when the system was operated as the Cincinnati, Dayton & Toledo Traction Company, or to have such an interest in the new power house as would equal the cost of such restoration.

This ruling was made upon the ground that when the new power house was built the five separate power houses were destroyed. The decision also holds that the underlying bondholders have similar rights in the new rolling stock, which was bought to replace old rolling stock sold or scrapped by the new company. Regarding the dispute over $250,000 which accumulated in the net earnings fund the court declares the operating company and the State Public Utilities Commission were neglectful as the net earnings should be apportioned among the several divisions on the basis of their earning capacity, and the court suggests a master commissioner be appointed to decide the proportion of distribution.

Two Years' Operation Compared

Service-at-Cost in Boston Proves to Be Earning More Nearly the Fixed Return

During the twelve months that ended Dec. 31, 1920, total expenses of the Boston (Mass.) Elevated Railway including dividends as guaranteed under the public control act, exceeded total receipts by $346,952. This result, however, is a great improvement over the preceding year, which showed a loss of $2,366,494.

The text of the report is the same as that included in the trustees' report to the General Court for the year ended Nov. 30, 1920, which was reviewed in the ELECTRIC RAILWAY JOURNAL of Jan. 22, page 197, and Feb. 26, page 420. All figures, however, are brought down to Dec. 31, 1920.

The average cost of service during the entire year was 10.246 cents per revenue passenger against average receipts of 10.143 cents. The average cost of coal was $10.07 per ton.

The views of the public trustees on the subject of fares are clearly expressed in favor of continuing the 10-cent flat rate for the time being. The 5-cent fare service on certain short lines not in competition with 10-cent lines is considered experimental until results can be determined.

Proper provision for depreciation is another highly important factor cited by the trustees as a reason and necessity for maintaining fares at higher levels than in the past. In concluding their report, they say:

> The occasion for the advance in fares on street railways is not alone the greater cost of labor, materials and supplies, but as well a radical change in policy with reference to provision for depreciation. It is now generally admitted that no sane management would fail to set aside from current receipts a sufficient amount to meet renewal and replacement of property that is wearing out day by day. The practice of maintaining these properties by hand to mouth methods has proved disastrous and is being abandoned.

INCOME STATEMENT

Operating Income:	Year Ended Dec. 31, 1920	Year Ended Dec. 31, 1919	Percentage Change
Passenger revenue	$33,096,764	$28,752,675	15.2
Special car revenue	12,183	14,869	*18.1*
Mail revenue	737	722	2.1
Express revenue	88,658	89,003	*0.4*
Miscellaneous transportation revenue	4,383	3,002	46.2
Total revenue from transportation	$33,202,725	$28,860,271	14.8
Station and car privileges	300,228	293,872	2.2
Rent of tracks and facilities	39,059	41,477	*5.8*
Rent of equipment	1,644	5,210	*68.5*
Rent of buildings and other property	100,500	82,514	21.2
Power	92,192	46,349	99.0
Miscellaneous	14,515	74,898	*80.5*
Total revenue from other railway operations	$548,138	$544,320	0.7
Total railway operating revenues	33,750,863	29,404,591	14.7
Railway Operating Expenses:			
Way and structures	3,226,275	3,783,715	*14.7*
Equipment	4,033,850	4,290,049	*6.0*
Power	4,568,992	2,980,659	53.2
Conducting transportation	11,524,823	10,530,882	4.4
Traffic	3,358	4,758	*29.4*
General and miscellaneous	2,411,824	2,110,285	14.2
Total railway operating expenses	$25,769,122	$23,700,339	8.8
Net revenue, railway operations	7,981,741	5,704,252	40.0
Taxes assignable to railway operations	1,142,988	1,045,502	4.2
Operating income	6,838,753	4,658,753	16.8
Non-Operating Income:			
Income from lease of road	823	823	....
Dividend income	9,180	9,180	....
Income from funded securities	6,357	6,290	1.0
Income from unfunded securities and accounts	233,380	42,853	444.0
Income from sinking fund and other reserves	28,853	33,280	*13.3*
Miscellaneous income	2,181	1,565	38.5
Total non-operating income	$280,774	$93,991	199.0
Gross income	7,119,527	4,752,741	49.6
Deductions from Gross Income:			
Rent for leased roads:			
West End Street Railway Co	$2,590,258	$2,540,893	2.0
West End Street Railway Co., Tremont Subway	177,686	176,545	0.6
Other roads	48,304	57,794	*16.4*
Total rent for leased roads	2,816,248	2,775,232	1.5
Miscellaneous rents	1,612,746	1,339,502	20.8
Net loss on miscellaneous physical property	9,326	7,986	16.8
Interest on funded debt	1,307,019	1,309,477	*0.2*
Interest on unfunded debt	207,945	246,313	*15.5*
Amortization of discount on funded debt	34,860	44,291	*21.3*
Miscellaneous debits	14,882	8,070	84.2
Total deductions from gross income	$6,003,026	$5,730,871	4.8
Net income transferred to credit of profit and loss	1,116,501	978,130	14.0
Proportion of dividends	1,463,668	1,403,970	4.3
Net loss or gain (including proportion of dividends)	*$347,167*	*$2,382,100*	85.2
Profit or loss—delayed items	215	15,605	....
Total deficit	*$346,952*	*$2,366,495*	

TRAFFIC STATISTICS

Year Ending December 31:	1920	1919	Percentage Change
Revenue Miles:			
Rapid transit passenger cars	14,540,474	14,139,619	2.9
Surface passenger cars	36,697,053	39,393,903	*6.8*
Express cars, etc	106,635	175,020	*39.4*
Sprinkler cars	15,693	12,707	23.2
Total	51,359,855	53,721,249	*4.4*
Revenue Car Hours:			
Rapid transit passenger cars	984,150	978,591	0.8
Surface passenger cars	3,643,145	3,770,727	*3.3*
Express cars, etc	10,218	16,765	39.1
Sprinkler cars	1,516	1,017	49.1
Total	4,639,029	4,767,100	2.7
Passengers Carried:			
Revenue passengers on rapid transit and surface cars	335,526,561	324,758,685	3.0
Miles of line	248.16	248.42	....
Miles of revenue track	461.87	462.56	....

• Italic indicates deficit or decrease.

Financial Rearrangement Proposed

Another change is proposed in the financial structure of the Northern Ohio Traction & Light Company, Akron, Ohio. On May 16 the stockholders of that company will vote on reclassifying the present 6 per cent preferred stock, of which $10,000,000 is authorized, so that $5,451,800 will be 6 per cent preferred stock and $4,548,200 will be 7 per cent preferred stock. The amount of common stock is to remain at $10,000,000. All preferred stock dividends are to be cumulative and save as to the rate of dividends, both classes of preferred stock are to have identical preferences and voting powers.

It is explained that during the past four years the company has more than doubled its gross earnings. Also during this period more than $7,900,000 has been expended in enlargements and improvements. More money is now required for like purposes. The course open to the company is to sell bonds, debentures or stock. As the present 6 per cent preferred stock cannot be sold at a reasonable price the management has decided that it would be advantageous to increase the dividend rate to 7 per cent and put out more stock than to issue debentures or other short-time obligations which would take precedence over the preferred stock and have a fixed maturity. The stock at the price offered will give the purchaser a return of 7.37 per cent. Stockholders are to be offered the opportunity:

1. To subscribe for 7 per cent preferred stock at 95 and dividends. For each share of 7 per cent preferred stock so subscribed, two shares of 6 per cent preferred stock may be exchanged for two shares of 7 per cent preferred stock.
2. To exchange 6 per cent preferred stock for 7 per cent preferred stock without subscribing for 7 per cent preferred stock upon the payment of $10 per share on condition, however, that the holders agree not to sell prior to Jan. 1, 1923, for less than $95 per share the 7 per cent stock so acquired. This requirement is to protect the company's market during the campaign which it proposes to conduct for the purpose of selling preferred stock to customers.

The company will accept payment in installments over a period of eight months.

A Road Without an Owner

The Monterey & Pacific Grove Railway, operating between Monterey and Pacific Grove, Cal., will have to raise $8,000 and be prepared to spend that amount in putting the system in shape, before any relief will be given in the shape of increased fares. This is the order of the Railroad Commission of California issued on April 11, on the application of the utility for authority to increase its charges.

The line was once controlled through stock ownership by the Coast Valleys Gas & Electric Company. The ownership, according to the Coast Valleys company, changed in May 1920, when the stock of the railway was sold at public auction in New York City to L. T. Fetzer. It brought $184. The Coast Valleys Company, however, still owns the carhouse and shops. James S. Pollard, president of the Coast Valleys, says there is no corporate connection between his company and the owner of the railway line.

Neither the New York owners nor the Coast Valleys are willing to assume liability for the railway company's bonded indebtedness or other debts. At the public hearing on the matter held by the commission the local manager of the road was asked if he or some other authority would make available a few hundred dollars necessary to make urgent track repairs.

"There is no such authority," he answered.

The commission is satisfied that the local management is capable, but it says the needed cash must be placed at his disposal before higher fares will be considered. Investigation by the commission shows that there is outstanding common stock of the par value of $300,000 and $270,000 of bonds. The total investment in road and equipment, as shown by the company's last annual report, December, 1920, is $612,833. Against these figures the commission's engineers find a reproduction cost of $132,488 and a depreciated reproduction cost of $73,214.

Bond May Remove Need for Receivers Acting

Action taken by Homer Hennegar, judge of the Tippecanoe County Circuit Court at Lafayette, Ind., in the appointment of receivers for the Lafayette Service Company, was suspended recently when the defendant company filed an appeal bond in the sum of $75,000. In consequence the local railway is again placed in the control of the Lafayette Service Company and Edward M. Watson and Frank Scott, receivers, are relieved of their duty until the Supreme Court of Indiana rules on the appeal.

Mr. Watson and Mr. Scott recently took over the management of the railway as receivers following proceedings instituted by a local property owner, who alleged that by reason of the company's failure to relay tracks and resume service on East Main Street his property there had been damaged.

A special attorney for the city asked that the appointment of a receiver be delayed in the interest of the Eastern bondholders. The court refused to defer action and said that the receivers would be empowered by the court to proceed with the relaying of the East Main Street track and make other needed repairs. The railway attorneys gave notice of appeal.

It is said that the attorney of the bondholders made a statement at the hearing on the petition for a receiver that the line would be improved generally and the Oakland Hill line rebuilt, and that six new one-man cars would be put in operation in Lafayette by Sept. 1. The filing of the bond will now afford the company an opportunity of carrying out these suggestions of the attorney.

Cheerful News—Seattle Has a Surplus

If Seattle can keep up the pace of earnings established by the Municipal Railway in March then two years hence the present cash deficit in the operation of the road may be wiped out. This is the assumption based on the surplus of $18,538 shown for that month. Mayor Caldwell has never waxed very enthusiastic about the Municipal Railway, but he is cheered by the change from red to black in the statement of earnings. He said:

> The financial report of the Seattle Municipal Street Railway for March, delivered to me by the general superintendent of railways, shows the total revenues $545,382.
>
> This was swelled by some forteen odd thousand dollars received in March for property previously sold, thus swelling the receipts to $564,098.
>
> The total expenses for March were $383,129. To this expense should be added interest on general bonds, $2,979; interest on utility bonds, $68,533; discount on utility bonds, $575; miscellaneous interest (warrants), $1,375; or a total expense for March, exclusive of depreciation, $456,593; to which should be added one-twelfth of the installment of principal due next March, $70,250, or a total expense, including installment of interest and principal of $526,843, with revenues of $545,382, or a surplus of $18,538 to apply on the actual cash deficit or on depreciation charge.
>
> If this basis continues for two years we will be able to wipe out the actual cash deficit. The receipts of the fourteen odd thousand dollars above referred to will also go toward wiping out the actual cash deficit.
>
> The only other full month on the present 8⅓-cent fare is February, with its twenty-eight days. By taking 28-31 of the March revenues of $545,382, we get $492.603, for twenty-eight days as against $492,758, revenues for February, or practically the same.
>
> The total number of passengers of all kinds carried during the thirty-one days in March was 8,398,294 as against 7,523,915 for the twenty-eight days of February and as against 8,466,553 for January, eight days of which were under the 6¼-cent fare. The figures show that Easter Sunday, March 27, there were 237,947 passengers, or 42,000 more than on any other Sunday in the month. Evidently a lot of people go to church once a year.

Service Resumed by Commission Order

Public Service Commissioner Barrett authorized the Brooklyn Rapid Transit Company on April 24 to resume service on the Church Avenue line without transfers. The order followed the enactment of the bill of Assemblyman Walter F. Clayton, under the terms of which the Public Service Commission was granted authority to permit service for a 5-cent fare minus transfers. The original charter of the old Nassau Electric Railroad provided for transfers, but Receiver Garrison said the line could not be operated at a profit if the transfer privileges were insisted upon. The line has not been running since the strike in August of last year. It carried 1,000,000 passengers a month, about 600,000 of whom the company claimed took transfers. The shutting down of the line has been a great inconvenience to the traveling public, the line being the only crosstown line in that section of Brooklyn.

Financial News Notes

Mr. Adair Resigns as Atlanta Director.—Forest Adair has resigned as a director of the Georgia Railway & Power Company, Atlanta, Ga. He has been a director of the company since 1912.

Abandonment Approved.—The Millville (N. J.) Traction Company has been granted permission by the City Commission of Millville to abandon its line in South Millville and the tracks will now be removed.

Rhode Island Company Losing.—In its report for February, 1921, recently submitted the Rhode Island Company, Providence, R. I., failed by $109,141 to meet its fixed charges. This makes a deficit for the first two months of the year of $183,219. The passenger earnings, however, increased $61,827 or 12.5 per cent over the same month a year ago.

Receiver for Austin Street Railway.—William J. Jones, president of the Austin (Tex.) Street Railway, has been appointed receiver of the company on the application of the Rochester Trust Company, Rochester, N. Y. *Moody's* gives the only bonded indebtedness of the company as $780,000 of 6 per cent bonds dated 1911 and due 1936, with the Equitable Trust Company, New York, N. Y., as trustee.

$800,000 Written Off.—In connection with the payment of the dividend for the first quarter of 1921, at the rate of 7 per cent, the Capital Traction Company, Washington, D. C., announced that increased earnings during the last two years have made it possible for the corporation to write off losses of previous years due to the enforced retirement of single-truck cars. Some $800,000 was written off.

Car Trusts Offered. — Alexander Brown & Sons, Baltimore, Md., recently offered for subscription at prices to yield about 8 per cent, according to maturity, $240,000 of 7 per cent car trust bonds of the Annapolis Short Line

Railroad. The bonds are dated Jan. 1, 1921, and are due $24,000 annually from Jan. 1, 1922, to 1931. They are unconditionally guaranteed as to principal and interest by the Washington, Baltimore & Annapolis Electric Railroad.

Sale Decree Filed.—An agreed decree approving the sale of the Gary (Ind.) Connection Railway and the Gary & Valparaiso & Northern Railroad to representatives of the first mortgage bondholders of the two companies was filed with the clerk of the Federal court recently. The object of this suit, it is said, is to enable the first mortgage bondholders to continue the operation of the roads and to clear the bonds and lift the receivership. Actions to declare the roads insolvent were filed in 1918.

Commission Modifies Bond Issue.—An order has been made by the Public Service Commission of Indiana modifying a former order permitting the Indianapolis & Louisville Traction Railway, Scottsburg, Ind., to issue $178,000 of 5 per cent first mortgage bonds, dated April 1, 1912, and maturing in thirty years. The previous order permitted the sale at 80 per cent of par, but the bonds may now be sold at not less than 75 per cent. The proceeds are to be used solely in paying 80 per cent of the cost of improvements and additions made between June 16, 1919, and Sept. 20, 1920. The company has been absorbed by the Interstate Public Service Company, Indianapolis, Ind.

Limit to Indebtedness Removed.—The limit of indebtedness of the Minneapolis Street Railway, which has been $1,200,000, has been removed by an amendment to its articles, filed with the Secretary of State. The directors voted a resolution which reads: "Whereas it is deemed advisable by said Minneapolis Street Railway that said limitation of indebtedness or liability be removed, now, therefore, be it resolved that Article 4, limiting indebtedness and liability to $1,200,000, be and the same hereby is amended to read as follows, to wit: "The amount of indebtedness or liability to which said corporation shall at any time be subject shall not be limited."

B. R. T. Wants Transfer Points Discontinued. — Although Public Service Commissioner Barrett has approved the application of three companies at present under the receivership of Lindley M. Garrison to resume experimental operation on a part of the Park Slope line the Brooklyn Rapid Transit Company, Brooklyn, N. Y., has refused to put its own plan into effect. A new condition for restoring service in that section is that the Public Service Commission should permit the discontinuance of the 2-cent transfer at thirty-six other points in the borough. Service on the Park Slope line has been suspended since Jan. 13. The operating companies promised resumption if the route were made shorter. When the commission did not approve of shortening the route service was abandoned.

Hartford Lines Doing Well.—President Lucius S. Storrs of the Connecticut Company said at a recent hearing before a committee of the Legislature at Hartford that the 10-cent fare—raised from 7 cents on Nov. 1, 1920—has been very successful from a financial standpoint. The Connecticut Company's local charter requires the payment to the City of Hartford of 2 per cent of gross receipts. This amounted to $34,283 on an income of $1,714,176 in 1919 and $42,883 in 1920, when the gross receipts were $2,144,194. Thus there has been an increase in income on Hartford lines of $430,017 in the past year. In Hartford jitneys were eliminated by means of a city ordinance, so that the company is free from competition that has grown to serious proportions in other cities in which the Connecticut Company operates.

$15,000 Voted for San Francisco Appraisal.—At a meeting of the public utilities committee of the Board of Supervisors of San Francisco, Cal., on April 13, it was voted to recommend that the finance committee provide $15,000 for the city engineer's appraisement of the properties of the United Railroads and to fix a valuation at which San Francisco can acquire the system by paying for the property out of the earnings of the railway without a bond issue. According to Amendment 30, carried by a 30,000 majority on the November, 1920, ballot, an enabling act was approved providing for the purchase of public utilities on a "pay-as-you-go" basis. It is expected that a proposal for the purchase will be placed on the ballot at the general election in November.

$221,786 Surplus at Richmond.—Incident to changing its year from June 30 to the calendar year stockholders of the Virginia Railway & Power Company, Richmond, Va., met on April 21. Only routine matters were discussed and the present directors and officers were re-elected. The statement of earnings and expenses of the company compiled for the system for the six months ended Dec. 31, 1920, showed the total gross earnings to be $5,779,545, an increase of $987,494 over the same period of 1919. Operating expenses totaled $4,280,682, an increase of $1,074,314 over the same period of 1919. Taxes and licenses paid by the company for the six months amounted to $354,701, an increase of $28,339. The surplus over fixed and all other charges, including depreciation, for the entire operations for the period was $221,786.

Dallas Steadily Going Behind.—A detailed statement of operating costs and revenues for the thirty-nine months of its operation under the present franchise was presented by the Dallas (Tex.) Railway before the Board of City Commissioners in the fare hearings now being conducted on the company's application for a 7-cent fare. The operating statement shows that the company incurred a deficit of $651,374 between Oct. 1, 1917, and Dec. 31, 1920, and that the return realized for the first three months of 1917 was 4.55 per cent; in 1918, 3.75; in 1919, 5.09, and 1920, 4.87. The return for the operation of the terminal for these periods was somewhat less. The pay of platform men has increased 113 per cent since 1915, according to figures in the statement. The property value of the company has increased from $7,662,069, to $9,317,813 in the last three years. The original valuation was agreed upon when the franchise was granted and each addition has been made in accordance with the terms of the franchise and on authority of the Supervisor of Public Utilities.

Even Electric Railway at Miami Prospered.—The wealth of the world goes to Miami, Fla. Moreover, the wealthy don't all ride around in the lap of luxury in their own Packards or Rolls Royces. Not at all. Proof of this is available. Look at the Miami Beach Electric Company's record. Bringing the total number of passengers for the season up to more than a quarter millon—263,165 to be exact—the Miami-Beach Electric Company, Miami to Miami Beach, Fla., hauled 80,166 passengers during the month of March, according to figures announced by Manager Ellis. Then, too, the company paid the county of Dade, which built the causeway the electric company uses, $1,101.16 during the month. This represents 1½ cents for each passenger that crossed the causeway by trolley. Mr. Ellis now proposes to take up with the county commissioners the question of building four switches, 300 ft. long, two of which have to be built on the causeway, so as to permit a ten-minute schedule between Miami and Miami Beach.

Protective Committee Recommends Refunding.—Owing to the continuation of the receivership of the Birmingham Railway, Light & Power Company, Birmingham, Ala., the company found it impossible to pay off the $1,200,000 of 6 per cent two-year gold notes which fell due on April 1. The notes originally came due on April 1, 1919, but were extended to April 1, 1921, at 7 per cent. The protective committee representing the noteholders has entered into a tentative agreement with representatives of the owners of the equity of the property, under which it is proposed to issue to the depositing noteholders general and refunding mortgage twenty-year 8 per cent bonds, Series A, par for par. In addition the company proposes to use the proceeds of $800,000 of general and refunding mortgage twenty-year, Series B, 8 per cent bonds, together with cash from the sale of securities junior to these bonds, to reduce the floating debt to an amount not to exceed $450,000. Failure on the part of the committee to deliver 85 per cent of the outstanding notes for exchange will defeat the plan. At the time the proposal for the exchange was made to the security holders there were on deposit with the committee $1,197,000, par value, out of the $1,200,000 total of notes outstanding.

Traffic and Transportation

Eight-Cent Fare Still

Court Restrains City of New Orleans from Reducing Fare of Railway in Receivership

Judge Henry D. Clayton, Montgomery, Ala., presiding in the Federal District Court at New Orleans, La., in lieu of Judge Rufus E. Foster, who excused himself at the suggestion of the officials of the city government, has sustained the contention of the New Orleans Railway & Light Company and granted the company a temporary injunction restraining the city from interfering with the operation of cars there or changing the rate of fare, fixed by the court at 8 cents.

An ordinance adopted by the city placed the rate of fare at 7½ cents. This rate of 7½ cents Judge Foster refused to approve. Moreover, Receiver O'Keefe, of the railway, refused to put the new rate in force under the ruling of the court. The city has two weeks to answer the temporary injunction and City Attorney Ivy G. Kittredge and his assistants are now engaged in preparing the city's defense against a permanent injunction.

The people have taken the decision uncomplainingly, but not so the city officials. It is the belief of Commissioner Maloney, of the Public Utilities Commission, that the ruling of the court paves the way for an ultimate fare of 10 cents. He bases his opinion upon the ruling of the court which restrains the city from interfering with the 8-cent fare or any other rate of fare which the federal court and the receiver of the company may determine as necessary to give a fair return upon the valuation of the property.

From figures taken from the petition of the railway and reports of the business transacted by the company during the first two months of 1921 Commissioner Maloney draws the conclusion that there will be a difference of $1,425,549 between the 3.1 per cent earned at present and the 8 per cent return petitioned for. With reference to this matter Mr. Maloney says:

> From the petition of the receiver it is noted that the alleged value of the railway property is given at $29,400,000 and that the rate of return he asks is 8 per cent.
>
> During the first two months of this year the system earned a net return of 3.1 per cent. He asks the court for such other fare as the court may find necessary to enable the payment of all operating expenses, the usual reserve and a "fair return" on the valuation of the property.
>
> The city is enjoined from interfering with the 8-cent fare or the other fare that the court may fix.
>
> On the basis of 110,000,000 passengers carried yearly an increase of 1.3 cents per passenger would be required. Interest on the new money would call for an additional increase bringing the total fare up to about 10 cents.

There is talk on the part of representatives of the city of permitting the jitneys to return.

It is reliably reported that a representative of the Eastern investment bankers, now on his way to New York, called on Commissioner Maloney to learn his final stand on the matter and that nothing will be done until word is received from this representative.

Bus Regulation May Go to a Vote

The old traction fight at Toledo, Ohio, will again be brought before the people at an election this fall through the filing of a referendum on the bus regulatory ordinance passed by Council a month ago. It had been proposed to put the ordinance into effect on April 21. It provided for tax of from $25 to $100 for each vehicle and required the bus owner to furnish bond from $5,000 to $10,000 depending upon carrying capacity.

The measure was counted upon to put the bus business on a fair competitive basis with the cars of the Community Traction Company, and it was thought it would divert between $500 and $1,000 a day to the railway system. Street Railway Commissioner Wilfred E. Cann and city officials favored the regulation of the buses. They will probably make an active fight before the people for passage of the ordinance.

Progress is reported on the fixing of a fair rate for power to be charged by the Toledo Railways & Light Company for the operation of the traction lines. David Friday, Ann Arbor, economist, and V. B. Phillips, Cleveland, consulting engineer, have been retained by the city to fix the charge for this service.

Five-Cent Fare Lines Planned in Medford

The trustees of the Boston (Mass.) Elevated Railway have authorized the extension of the 5-cent fare for local riders to six lines operating in Medford and part of Somerville to the Sullivan Square terminal of the main rapid transit line. As in the case of the 5-cent fare service in Malden and Everett, started recently, a fare of 5 cents will be charged for a local trip without transfer by means of payment to the conductor on the car, while a 10-cent fare will be charged if the passenger continues his ride on the rapid transit line to Boston. A local crosstown service will also be started in this community, operated with one-man cars, on a 5-cent fare basis.

No date has been set for commencing this service, but it will be undertaken as soon as the necessary arrangements can be made for the collection of 10-cent fares from inbound passengers arriving at the Sullivan Square Terminal on these lines.

Railway Protest Unavailing

Autos to Compete with Bamberger Electric—Commission Must Not Bar Progress

An automobile stage line is to be operated between Salt Lake and Ogden, Utah, a certificate of convenience and necessity having been issued by the Public Utilities Commission of Utah, after a hearing on the application for the permit of Bruce Wedgwood and Fred A. Boyd.

The application of Wedgwood and Boyd was contested by the Bamberger Electric Railroad and the Oregon Short Line Railroad, on the ground that they are prepared and ready to give adequate freight service, by means of equipment and rights-of-way obtained at a huge expense, and that there is no public necessity or convenience to be served by the new method of transportation that they cannot serve or are not willing to serve. They further set up that the proceeds of the taxes they pay go in part to the construction and maintenance of the highways. The applicants, it was pointed out, would operate over these highways, without contributing anything to their construction or maintenance.

CLAIMS OF THE TRUCK OPERATORS

On the other hand the operators of the truck service contended that they are able to give a superior service, one that would be speedier in its operation, and would also require the handling of the goods fewer times. The commission yielded to this argument, but in deciding that service may be established also sets up some conditions.

In its decision the commission said in part:

> The applicants must furnish stations, warehouses and persons to take charge of and keep, with reasonable safety, the freight intrusted to their care. There must likewise be an assurance that the parties giving service will be able to furnish sufficient rolling stock to take care of the business. Such direct handling and hauling of freight would clearly indicate that a service would be rendered that would be more convenient and direct than is given by the railroads.
>
> The commission should not attempt to bar progress. The power vested in the commission is intended to be constructive, not repressive. The public is entitled to the best service possible to be given, and to the freest utilization of valuable new inventions. If the motor truck can demonstrate its superiority over the railroad for the transportation of short-haul freight, and if by its use economy of time or money is effected, public convenience and necessity will require its being brought into service, and ultimately it will be used, with or without sanction.
>
> Even now trucks are carrying great quantities of freight over the route in question here. This is being done under private contract, which places the service outside the range of regulatory law. If this petition is granted it is probable that much of this traffic will come under control, and rates and service will be stabilized and made more satisfactory and dependable every way to the shipping public than it now is under private contract operation.

The order requires the publishing of schedules of rates and fares and of arriving and leaving time at the various stations to be served by the new service. It is effective on due notice to the commission and the public, which means thirty days after filing with the commission.

San Antonio Decision Prompts Filing of Supplementary Brief

Recent decisions of the United States Supreme Court in public utilities rate cases, especially the case in favor of the electric railway at San Antonio, have prompted Churchill Humphrey, attorney for the Louisville (Ky.) Railway, to file a supplemental brief in the United States District Court of Appeals at Cincinnati, claiming that the litigation now pending between the Louisville Railway and the city of Louisville in the Federal Courts is analogous to the conditions governing the San Antonio case.

Mr. Humphrey holds that the two cases are alike in that the city of Louisville is without legislative authority to enter into an irrevocable contract with the company, since by so doing it would lose its right to regulate the operation of the railway system.

A Dead Cow Is Worth More Than a Live One

A combination of paris green to turn the grass brown and the free-range law in Florida have just cost the Tampa Electric Company $11,000—for the usual array of registered cattle that always bobs up where only the tick-infested breed sprung before the railroad knocked 'em over, or in this case the railway poisoned them.

In an endeavor to eradicate weeds and grass growing between its tracks on the suburban line to Port Tampa the Tampa Electric Company sprinkled the way with a solution of paris green. During the night the "sacred" cows of folks along the line and in Port Tampa indulged freely of the grass and weeds and a total of 102 died within the succeeding ten days. Of course they all died from the poisoned grass. When it came time to settle the cows came high. The owners even refused to allow for the hide and collected in a total, more than $11,000 according to T. J. Hanlon, Jr., general manager.

The Tampa *Tribune*, waging a fight for a No-Fence law abolishing free range, seized upon the incident to show passengers one of the reasons why railroad rates and trolley rates seem high—because the public must foot the bill for such follies as free range.

Railway May Take Over Jitneys

The possibility was discussed of bringing the entire transportation facilities of Muskegon, Mich., and surrounding community under the ownership of the Muskegon Traction and Lighting Company and under control of proper, publicly constituted authority at a hearing recently conducted by the Michigan Public Utilities Commission.

A joint committee representing the various interests of the community was named to compile a definite report as to the possibility of the traction company buying the bus equipment now in use, and to gather all other necessary data relative to a revolutionary move of this kind.

If the traction company finds it possible to finance such an undertaking it appears likely the committee will recommend that this solution of the present and long-standing problem be adopted.

President George Steinwedell said he would take the matter up with the company at once and would know in a short time if it would be possible for the company to purchase the jitneys, which have a present value of about $50,000.

East St. Louis-St. Louis Rates Upheld

The Interstate Commerce Commission has dismissed the complaint of the Greater Belleville Board of Trade against the fares on the East St. Louis & Suburban Railroad for the transportation of passengers from Belleville and East St. Louis, Ill., to St. Louis, Mo., finding them not unreasonable, unduly prejudicial, or otherwise unlawful. It was charged that the railway had not only increased materially the interstate fares previously in effect, but had changed the basis of such fares by establishing various fare groups or zones.

The complaints further stated that the fares assailed materially exceeded the one-way and commutation fares previously in effect, and that the time within which commutation fares could be used had been reduced from sixty days to a calendar month. They contended also that the present fares were unreasonably high, distances considered, in comparison with fares in effect over defendants' city line, and that the disruption of long-existing fare groups retarded the development of these communities, and imposed an undue burden upon their inhabitants.

Witnesses for the railroad testified that electric interurban lines generally throughout that section were charging 3 cents per mile, having obtained injunctions from the federal courts wherever the provisions of state statutes were contravened. They showed that the fares on the Belleville division had been maintained on a lower basis than those applying over their other interurban lines. The former, as increased on the dates previously mentioned, average slightly more than 2 cents a mile from Belleville to St. Louis, and a fraction under 2 cents to East St. Louis, whereas the latter were increased at the same time to 3 cents per mile. The travel over the other divisions is not as heavy as over the Belleville division, but the witnesses for the company said that due consideration has been given to this factor.

"Tokens" for Convenience and Economy.—The Peoria (Ill.) Railway is using "Tokens" exclusively on its city lines at the rate of two for 15 cents or in multiples of 15 cents. The cash fare in Peoria is 8 cents.

Retention of Five-Cent Fare Recommended

City Attorney, Robert L. Shinn, of Sacramento, Cal., recently received a report from the California Railroad Commission offering recommendations for the operation of the Pacific Gas & Electric Company "with increased revenue without sacrificing service." Among the suggestions are the following:

A continuation of the present 5-cent fare.

The installation of thirty-six new one-man cars.

The construction of a loop at the Southern Pacific station.

The elimination of duplications of service at a saving of $29,000 for the year.

The continuation of bus service.

In the matter of continuing the present 5-cent fare, which was the point at issue when the Pacific Gas & Electric Company sought the survey, the elimination of coupon books is suggested, thus making all regular fares 5 cents. It is also recommended that a full half fare be charged school children and that all free transportation except to those in the transportation department be denied. Commissioner D. N. Carmichael has stated that he is willing to carry out the recommendations of the State Railroad Commission if the company will assist the city.

Civic Bodies After Des Moines Jitneys

The two leading business men's organizations and the women's club took a hand during the week ended April 16, in an effort to help bring order out of chaos in the Des Moines City Railway-City Council-jitney controversy. The Greater Des Moines Committee and the Chamber of Commerce each chose committees to make it their special business to help solve the problem, while the women's club adopted resolutions urging elimination of the buses.

A meeting of the two committees named by the commercial organizations with members of the City Council, representatives of the street railway employees unions and officials of the Des Moines City Railway was set for April 18 and it was the hope of the civic organizations that some tangible good would result.

In its preliminary work the committee of the Chamber of Commerce offered three possible suggestions:

1. Abrogation of the present working agreement between the company and its trainmen, and placing the men on an open shop basis.
2. Elimination of the buses from the streets on which street cars operate.
3. Reduction of the fare from 8 cents to 6 cents.

According to the terms of the Lake jitney bus bill, passed at the recent session of the Iowa Legislature, councils of Iowa cities may by vote restrict the operation of jitney buses to streets which are not occupied by electric railway tracks. This law will give the City Council of Des Moines a chance to rid the city of the buses in case a settlement is made of the street railway question.

Prefer 10-Cent Fare to Zone System

The Massachusetts Department of Public Utilities has announced a public hearing to be held on May 4 in Boston, on the petition of eleven cities and towns served by the Worcester Consolidated Street Railway for a revision of the suburban zone fare system now in effect. The petitioners protest the 7-cent zones and request a return to the old fare limits, generally speaking the boundaries of cities and towns, a 10-cent flat fare being suggested. The city of Worcester is not included in this matter, a 10-cent fare having been established there on Feb. 6 by order of the Department of Public Utilities. It was at that time that the fare on the suburban line zones was increased from 6 to 7 cents per zone, this increase having lead the suburban patrons to petition for a flat 10-cent fare in preference to the short zone system and 7-cent rate.

Transportation News Notes

One-Man Cars for Entire System.—The Madison (Wis.) Railways has petitioned the Railroad Commission for permission to equip its entire system with one-man cars.

Ten-Cent Fare in Effect.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., is now charging a 10-cent fare on its Pennsylvania divisions running out of Trenton, the increase having been allowed by the Public Service Commission of Pennsylvania. The company had been charging 8 cents.

Eight Cents in Scranton.—Under an order recently handed down by the Pennsylvania Public Service Commission the Scranton Railway is authorized to collect an 8-cent cash fare upon thirty days' notice, with four tickets for 30 cents. The present rate is 7 cents, with four tickets for 25 cents. At the expiration of a year, during which time the new rate will be in effect, the commission will review the railway finances and give a new finding.

Ten Cents in Alton.—An increase from 8 cents to 10 cents in fare on the Alton lines of the Alton, Granite City & St. Louis Traction Company has gone into effect. The rate between Venice and Brooklyn has also been raised from 8 cents to 10 cents, with tickets at five for 40 cents. Federal Judge English has granted an injunction restraining Illinois authorities from interfering in the fare adjustment by the company, which is in the hands of federal receivers.

Galveston Railway Gets New Hearing.—Judge Hutcheson recently granted the motion asked by counsel for the Galveston (Tex.) Electric Company for a new hearing, after having recently decided the case in favor of the City of Galveston in denying an injunction against the enforcement of the 5-cent fare ordinance. The court indicated that more information on the cost of maintenance and depreciation will be forthcoming through the appointment of a special engineer by the court for investigation of the costs.

Ten-Cent Fare Denied.—The Board of Public Utility Commissioners of New Jersey has declined to consider an application of the Jersey Central Traction Company for permission to increase fares on all its lines from 7 to 10 cents, pending action by the State Supreme Court on an appeal from a ruling of the old board which rejected a similar application. The application was based on a statement that under the present tariffs the company has lost money steadily and will be forced into the hands of a receiver unless relieved.

Recommendation Reported Incorrect.—H. C. Eddy, street railway engineer of the Board of Public Utility Commissioners of New Jersey, denies that the recommendation was his that patrons of the Trenton & Mercer County Traction Company, Trenton, N. J., be required to have the exact fare ready when they board the cars or be made to pay 10 cents for a ride. Reference to this recommendation was contained in an item entitled "Commission Inspector Reports on Crowding," which appeared in the ELECTRIC RAILWAY JOURNAL for April 9.

Eight Cents in Cedar Falls.—Fares in Cedar Falls, Iowa, were increased from 7 cents to 8 cents on April 1. This change is in accordance with an agreement made between General Manager Cass of the Waterloo-Cedar Falls Northern Railway, Waterloo, Iowa, and the City Council that the company could advance the rate if after operating for a month under the 7-cent fare the revenue was found to be less than the average monthly revenue derived from the 10-cent rate which had been in existence for the five months previous. A statement issued from the offices of the company's auditor shows that there has been a decrease of 15.3 per cent as compared to the average daily receipts for the five months previous.

Fares Lowered in Rockford.—The Rockford and Interurban Company, Rockford, Ill., has lowered cash fares from 10 cents to 8 cents within the city limits of Rockford. The company has been charging 10 cents since March 1, 1921, and the new fare became effective April 1. The rate of cash fare is the same on both interurban and city cars within the corporate limits. The decision of the company to reduce the fare 2 cents was reached following complaints of Rock View residents, who objected to paying 10 cents, inasmuch as they live adjacent to the Elgin and Belvidere Electric Company and the Fifth Avenue cars of the City Traction Company of Rockford, both of which now charge 8 cents. All cash fares are now equal.

Reasons for Fare Increase Explained.—Increases granted to the Orem Electric Railroad, Salt Lake City, Utah, in passenger fares are not for the purpose of paying dividends, according to W. C. Orem, president of the company. To make this plain Mr. Orem has had prepared a number of bulletins for display in all of the waiting rooms of the company. The bulletins set forth the amount of increases allowed, which is from 3 cents to 3.6 cents a mile for one-way, with 180 per cent of the one-way fare for the round trip. The former fares for round trips were 190 per cent of the one-way fare. Commutation and school tickets have not been increased in price. Following this citation of fares is a statement that the increased revenues are for the purpose of meeting increased wages, high cost of materials, higher taxes, and interest on money borrowed.

Two Zones Instead of Three.—The Public Utilities Commission of Utah has rendered a decision establishing two zones on the Holliday line of the Utah Light & Traction Company instead of the three which have prevailed in the past. The order is issued as a result of a petition filed by patrons of the line alleging that the three-fare rate was discriminatory and had held back the settlement of the southeastern territory served by the railway. The complainants further alleged that the three-fare system worked an injustice on the traveling public and especially children attending school in Salt Lake. In answer the Utah Light & Traction Company alleged that the fares were just, in that the territory served is sparsely settled, and that the three-fare rate was necessary to produce adequate revenue. The new two-fare system became effective on April 6.

Fares Changed at Columbia.—The Columbia Railway, Gas & Electric Company, Columbia, S. C., discontinued the use of free transfers on Feb. 14, putting into effect on that date exchange tickets at a price of 3 cents each. In other words, the company installed the same kind of system that has been in use by the Philadelphia Rapid Transit Company for some time. The company has since applied to the Railroad Commission for permission to increase the fare from Columbia to Camp Jackson. Ever since the construction of the Camp Jackson line in 1917 it has charged 10 cents, or 5 cents for each zone, the line having two zones. The soldiers were given the benefit of the reduced rate by charging them 15 cents for the round trip when they purchased tickets at the camp exchange. If the company secures permission from the Railroad Commission to charge 7 cents in each zone, the special rate to soldiers will be discontinued and they will be required to pay the same rate of fare as civilians.

Personal Mention

Railwayman President

J. W. Shartel, Oklahoma Railways, Elected to Presidency of State Utilities Association

John W. Shartel has been re-elected to the presidency of the Oklahoma Utilities Association, the precedent of a single term for this office having been abandoned. Mr. Shartel is one of the pioneer electric railway builders of that state. He organized and built in 1902 the Oklahoma Electric Railway, Oklahoma City, Okla., of which he is now vice-president and general manager.

By virtue of the keen and farsighted policy of Mr. Shartel in providing abundant transportation facilities it has been possible for Oklahoma City to grow from a town of 15,000 to a city of 100,000 population in the brief period of about twenty years. The company has been liberal, almost to the extent of being radical, in building new lines through unsettled districts awaiting developments and has successfully carried a large percentage of unproductive mileage until the time when the volume of traffic became sufficient to make it self-supporting.

At the time the undertaking was started, the communities all being small, the street extensions were laid out with private rights-of-way in the center for car tracks, with the result that more than 110 miles of the 145 miles comprising the interurban and city systems are now on private rights-of-way. In advance of the growth of the city the rights-of-way procured for high-speed entrances for interurban cars into the centers of all cities are without grade crossings at either highway or railway. The company has acquired approximately 100,000 sq.ft. of valuable land leading into the heart of the city, where its present terminals are located and where it contracts all its interurban and city transfer business.

The growth of the property has been remarkable. It has been the product of a single mind from its inception to completion and has involved no loss by changes or reconstruction. Notwithstanding high war-time prices and conditions generally adverse to electric railways it has successfully withstood every strain and is now in a prosperous and flourishing condition.

Mr. Shartel was born in Harmonsburg, Pa., on May 1, 1862. Soon after his parents moved to Missouri, where he received his early education in the county schools. He was graduated from Kansas Agricultural College, Manhattan, Kan., in 1884. After leaving college he went to Topka, Kan., and studied law. Having been admitted to the bar in 1885 he practiced law in Topeka for a year and then went to Sedan, Kan. After serving three years there as county attorney in 1890 he formed a partnership with W. C. Hackney, and practiced at Winfield, Kan., until Jan. 1, 1893, when he moved to Guthrie, Okla., where the firm of Asp, Shartel & Cottingham was formed.

In 1898 Mr. Shartel came to Oklahoma City and became general attorney for the Choctaw, Oklahoma & Gulf Railroad, which position he held until 1901. Several years later he formed a law partnership with J. R. Keaton and Frank Wells, which continued until 1912, when he retired in order to devote his time to the Oklahoma Electric Railway, which he organized in 1902 and which had grown to such proportions that it required the greater part of his time.

J. W. SHARTEL

Obituary

Z. V. Taylor Dead

Z. V. Taylor, president of the Piedmont & Northern Railway, Charlotte, N. C., and president of the Southern Public Utilities Company, which operates street railway systems and other utilities in Charlotte and Winston-Salem, N. C., and Greenville and Anderson, S. C., died suddenly on the private car of J. B. Duke while en route from Charlotte to New York.

Mr. Taylor was active in the promotion of the Piedmont & Northern Railway, which was organized in 1912. The rapid growth of the road is shown by the fact that it now operates over 127 miles of track. At the time of his death Mr. Taylor was about to make extensions to the road, which had been blocked by the government's taking over the system in 1916.

The public has best understood his identity with the Southern Power Company as president of the Public Utilities Company and as president of its interurban lines. His spirit and energy permeated all branches of that organization. Perhaps the greatest business tribute paid to him was that shown eleven years ago when the Southern Power Company wanted a fair, diplomatic and astute man to give advice on those problems which confront a fast-growing corporation. He was chosen and secured for his company by winning words and a just, legal show of the facts, privileges and franchise concessions that made his services of great value.

It was in 1910 that Mr. Taylor, then head of the Greensboro Traction Company, was recognized by larger interests as a man whose ability was needed to help develop what later became the Southern Power Company. After three years at this work he and his associates formed the organization of the Southern Public Utilities Company, uniting electric and railway interests in four or five of the largest cities in North and South Carolina.

The stamina which Mr. Taylor had been able to inject into this merger of big concerns went far to make the company a success, and though tried at periods by business depressions it has never been threatened with a serious difficulty.

Mr. Taylor was born in Sparta, Tenn., in 1868. His early training was in the public schools of Oak Ridge, but later he carried on his education without school aid. He next read law under Judge W. P. Bynum at Greensboro, with whom he later formed a law partnership.

Arthur Busse, chief engineer of way and structure of the Great Berlin Street Railway, is dead. Mr. Busse was recognized as the greatest authority on track on the Continent and also was always interested and thoroughly familiar with American practices. During the last two years he had been in such poor health that he had retired from active operating duties, but his ardor for his work remained with him to the end. He was a great admirer of Theodore Roosevelt, whom he strikingly resembled.

J. Henry Meyer, president of the California Street Cable Railroad Company, San Francisco, Cal., and a director in nearly a score of large western firms, died on March 30. Death came after several months' illness. He was a native of Sacramento and sixty-six years old. As the business executive of Antoine Borel, a leading financier in San Francisco's early days, and later as an independent banker, Mr. Meyer exercised great influence in the development of the street railways in San Francisco and the street railway system in Los Angeles. Other firms thrived notably under his guidance. At the time of his death he was interested in many banking, realty and public utility companies.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Price of Trolley and Bell Cord Again Reduced

Reductions the Middle of This Month Made in Effort to Stimulate Buying—Stocks Are Curtailed

In an apparent effort to stimulate buying producers of trolley and bell cord have made further price reductions, effective April 13 and 18 in different instances. The price of cotton has been about holding its own for a considerable length of time now so the cost of material is no lower. At this writing spot cotton is quoted at 12.30 cents per pound, New York. Buying shows no improvement and producers are keeping their stocks low, though deliveries are made promptly.

The following prices are now in effect, the range representing the spread between different manufacturer's prices, and the quantity being in each case coil lots or 1,200 ft.: Bell and register cord, mahogany No. 6, 73 to 76 cents per lb.; No. 8, 70 to 73 cents; drab No. 6, 68 to 70 cents; No. 8, 65 to 67 cents; trolley cord, best grade sizes 8 to 12, 59 to 61 cents. Cheaper grades of waterproof trolley cord can be obtained at 51 cents per lb. and at 33 cents per lb., sizes 8 to 12. Mahogany trolley cord with a wire center is quoted by a leading producer at $22 per 1,000 ft. for No. 6 and $27, for No. 8 in coil lots.

Scrap Steel Market Declines During Past Month

Under Prevailing Prices Dealers Are More Anxious to Buy than Holders to Sell—Railroads Withdraw Lists

During the past thirty days prices of scrap iron and steel materials have been forced still lower than the prices quoted the last of March. Machine shop turnings have shown no change, holding at 5½ to 6 cents in net tons at Chicago, but other materials have receded from ½ cent to 2½ cents.

Prices quoted at Chicago now, in net tons, show No. 1 cast to be off ½ cent to 14-14½ cents; No. 1 R.R. wrought is down one cent to 10½-11 cents; No. 2 is down a cent to 9½-10 cents. Steel springs show a 1½-cent drop to 12-12½ cents; old steel axles have come down ½ cent to 14-14½ cents, while old iron axles have dropped 2½ cents to 24-25 cents.

For gross ton lots at Chicago, quotations are off one-half cent on car wheels to 13½-14 cents; R.R. malleable is lower by three-quarters cent to 14.75-15.25 cents and frogs, switches and guards have dropped one cent to 11-11½ cents. In the rails, old iron rails fell one-half cent to 17-17½ cents, old steel shorts fell one cent to 12-12½ cents and rerolling steel rails are lowered one and one-half cents to 11½-12 cents.

With these so-called low prices ruling at which dealers will consider buying, sellers are not anxious to get rid of their scrap as there is a feeling that an upward turn in the market is not far distant. Many buyers, on the other hand, are taking lots here and there in anticipation of a rise in market. Some railroads which had placed lists of scrap materials in the market have withdrawn these lists on hearing of the prices prevailing. Still other lists have gone through. Although buying has been light there is a better feeling in the trade since the leveling of steel prices two weeks ago. There is a reported scarcity in New York of steel car axles.

Asphalt About $8 per Ton Lower than 1920 Peak

Producers Feel that Quotations Are Close to Bottom—Good Stocks Are Held with Prompt Shipments

Prices of asphalt have hit bottom, according to the view of representative producers. The market on natural asphalt delivered hot in tank boats ranges from $33 to $35 per ton and for asphalt delivered cold in barrels from $33 to $36 per ton. On Mexican asphalt the quoted price in a representative instance is $22 per ton f.o.b. plant. The above prices represent decided reductions from the peak prices of 1920, which on natural asphalt ranged from $41 to $44 per ton. Prices have now held steady for nearly two months.

Stocks of the finished product with producers are fairly large, too much so in some instances. As a consequence immediate deliveries are generally quoted. Shipments of the raw product are prompt, the shortage which was existent last year under transportation difficulties having disappeared. Crude asphalt prices have declined somewhat as reflected in the finished product.

The volume of buying on the part of electric railways this spring has been below the level of other years, though in certain large communities there is a fair amount of activity. Demand on the part of municipalities for paving work of course represents the bulk of the buying, but the present year apparently will not quite come up to normal in that quarter either. There is a distinct tendency to hold off on making purchases and on that account producers expect business to improve this summer.

Lower Prices on Tubular Steel Poles

Recent Reduction in Steel Anticipated in Pole Prices Though Little Increased Buying Has Resulted

Inquiries in the market for tubular steel poles are numerous, it is stated, but there have been very few actual orders placed by electric railways this year. There has been some buying of combination railway and lighting poles, however, the main factor there being the insistence of merchants and municipalities that these orders be placed so as not to delay street improvement work. Several large railways have made inquiries covering their year's requirements on poles, but reluctance to buy has generally been shown because of expectations of price reductions.

In this connection an attempt has been made to check up the effect which recent price reductions on standard pipe and other steel products by the Corporation may have had upon tubular pole prices. One of the leading interests in this market states that it does not always follow that a reduction in standard pipe prices affects the selling price of poles, as on the latter product each sale is a transaction by itself so far as delivery and price is concerned. The price question in this instance is therefore left unanswered. Another large producer, however, made a decrease of $15 per ton on steel poles during February, and this cut, it is stated, more than anticipated the recent drop in the price of pipe of which poles are made. Therefore no additional reduction is contemplated from this source before the beginning of the third quarter, and no decrease will be made then unless steel prices undergo another decline.

Although present deliveries in this line are good, with shipments ranging from sixty to ninety days, prospects for improved buying are uncertain, according to producers. The view is expressed that electric railways will hardly purchase poles this year unless forced to do so by franchise conditions or extensions ordered by city councils.

Austria Asks for Car Bids in this Country

The United States Bureau of Foreign and Domestic Commerce, Washington, D. C., reports that quotations by cable are requested from Austria for twenty-four street cars, of which twelve are to be equipped with motors and twelve are to be operated as trailers. Seating capacity of the cars is to be sixteen persons, with standing room on the front platform for eight people and on the rear platform for ten. The distance between the rails is 1,445 millimeters and between the wheels 1,440 millimeters. Further information about the cars, which it is stated are urgently needed, can be obtained from the bureau or its district offices by mentioning 34,743 as a reference number.

Stranded Steel Wire Prices Follow Steel Down

Shipments Maintaining an Even Pace, but There Is Only a Small Volume of Orders

Activity in the market for stranded steel wire is not very marked at present. New construction work is not large in any field apparently, at least the volume of orders for this class of material does not show it. Shipments are being made right along, it is true, but there is no volume to the demand. A leading producer reports that orders for the first three months of this year maintained an even pace or about a million and a half feet of stranded wire shipped from New York City territory, though only about one-quarter of this was for construction work. One of the large manufacturers in this field has been out of the market altogether for the past six months, the inference being lack of buying activity.

Stocks of the finished product are large at factories, and immediate shipment can be made on common sizes. Prices on stranded steel wire declined recently in view of the drop in steel quotations. The reduction, it is reported, amounted to 10 to 15 per cent, or expressed in exact figures, $5 per ton with a representative producer.

$225,000 Loss in Pacific Electric Railway Fire

Fire of mysterious origin on April 20 completely destroyed the Pacific Electric Railway's divisional carhouse and shops at Redondo Beach, Cal., with an accompanying loss of $225,000. Besides the complete loss of the combination one-story brick structure serving as carhouse and shops, which covered half a city block, rolling stock consisting of seven of the company's heavy-type interurban cars, one city-type car, one line car, one electric freight locomotive, one box car, one flat car and one steel flat car was entirely destroyed. Several other cars were damaged; though the prompt removal of gasoline tank cars stored near by prevented more serious loss. The fire also destroyed a vast quantity of expensive repair material stored at the shops. Of the total loss sustained $150,000 was covered by insurance.

Electrification in Zanzibar

Along with extensive improvements to Zanzibar Harbor, extending over the next three years, one of the projects mentioned is a narrow-gage electric railway to run the length of the island, according to Guaranty Trust Company.

Standardization Being Discussed by Gear Manufacturers

The fifth annual meeting of the American Gear Manufacturers' Association is being held in the Hotel Sinton, Cincinnati, Ohio, April 27, 28, 29 and 30. Standardization and uniform cost accounting will be among the subjects discussed, and important action is expected by the association tending toward the establishment of a more complete standardization of the products of the gear industry.

According to the program that has been prepared G. M. Bartlett of the Diamond Chain & Manufacturing Company will discuss "The Ideal Chain and Sprocket Drive"; A. R. Mitchell of the Andrews Steel Company will speak on "Industrial Gears from the User's Standpoint"; J. B. Foote, president Foote Brothers' Gear & Machine Company, has been assigned "Worm Gearing," and J. B. Doan, president American Tool Works, has an unannounced subject.

Thirty-Mile Line Projected in China

According to the Guaranty Trust Company an electric railway line from Siangtan to Changsha, China, a distance of 30 miles, is under consideration. Plans include the possible purchase of fifteen cars.

Rolling Stock

Southern Pacific Company is expecting delivery of twelve new passenger coaches about May 12 to be placed in service on the Portland-Corvallis division about the middle of July. The cost of the cars, it is stated, is $37,000 each. The new equipment will provide surplus cars for emergency operation and to take care of excursion travel.

Detroit (Mich.) Municipal Railway, mentioned in last week's issue as placing an order for twenty-five safety cars, has issued the following information and specifications on these cars:

Number of cars ordered	25
Date of order	April 15, 1921
Date of delivery	June 16, 1921
Builder	Osgood-Bradley Car Company
Type	18 ft. safety
Weight, total	16,800 lb.
Interior trim	Cherry
Air brakes	Westinghouse DH-16
Bumpers	O. H. 6-in. rolled channel section
Car signal system	Faraday
Car trimmings	Statuary Bronze
Control	K-63
Curtain fixtures	Curtain Supply Company
Curtain material	O'Bannon double-coated, diced
Designation signs	Keystone, glass back
Door operating mechanism	Safety Car Devices Company
Heater equipment	Cutler-Hammer, truss plank
Headlights	Golden Glow, HDB-96
Lightning arresters	Westinghouse
Motors	Westinghouse, 508
Paint	Sherwin-Williams, Old Dutch, oil enamel
Registers	International, type R-10
Sanders	Osgood-Bradley
Sash fixtures	J. L. Howard & Company
Seats	Reversible slat, cherry
Step treads	Feralun
Tail lights	Nichols-Lintern Duplex indicating
Trolley catchers or retrievers	Ohio Brass
Trolley base	Ohio Brass, form No. 1
Trucks	Osgood-Bradley, 25-96

Track and Roadway

Los Angeles, Cal.—Construction of a tunnel to relieve the downtown congestion of Los Angeles, Cal., has been started and will have a considerable effect on street car travel. The bore is known as the Second Street tunnel and will run from Hill to Figueroa Streets, a distance of 1,502 ft. Car tracks have been removed from Second Street.

Detroit (Mich.) Municipal Railway.—Contract for furnishing 11,200 tons of steel rails and special work for the Detroit Municipal Railway has been awarded to the Lorain Steel Company, the only bidder on the entire equipment for which bids were recently opened. The excavation work and construction under way and contemplated by the commission are being rushed.

St. Paul City Railway, Minneapolis, Minn.—The St. Paul City Railway is to begin its 1921 paving program between the tracks at once. This proposal was accepted by the City Council. This is a matter that has been held in abeyance for a long time owing to the company's inalibity to finance the work, and even now the money will be taken from sums laid aside for other purposes. This will provide for a beginning until other funds are available.

Fort Worth, Texas.—The City of Fort Worth, Texas, has made a guarantee to the Federal Government that a car line will be built and put in operation to Lake Worth, the city resort about nine miles northwest of the city. This pledge was made to comply with one of the conditions incident to the selection of the proffered site at Lake Worth for the Soldiers' Rehabilitation Hospital to be built by the Government.

Oil Fields Electric Railway, Eastland, Tex.—An extensive system of interurban electric railways is to be built in this part of the State by the Oil Fields Electric Railway, being organized by W. Y. Fleming and associates. Preliminary surveys have been made for a iine to run from Fort Worth to Cisco, through Graham, Breckenridge and other towns. Another line is to run from Wichita Falls to Abilene, through Stephenville and Brownwood. A branch line will run from Caddo to Ranger, thence through Eastland to Cisco. From Ranger a branch line will be built to Desdemona. From Cisco, lines will go to Hilburn, Rusing Star, May and on to Brownwood. Another line from Cisco will run through Putnam and Baird to Abilene. From Caddo a main line will be run to Breckenridge and will branch off to Eliasville, through Ivan, from Eliasville to Graham and from Graham to Loving, Archer City to Wichita Falls. The principal office of the company will be at Eastland.

Olympia Light & Power Company, Olympia, Wash.—The Olympia Light & Power Company expects to replace three miles of plate joints with continuous rail joints on the present 40-lb. rail.

Seattle (Wash.) Municipal Street Railway.—The utilities committee of the City Council has made a tentative decision to recommend several extensions of the Seattle Municipal Street Railway, and D. W. Henderson, superintendent, has been asked to submit new estimates on the cost of extending the Beacon Hill line to Chicago Avenue, the Alki line and the Fifteenth Avenue and Cowen Park lines. It is the intention of the committee, if favorable action is decided upon, to recommend the sale of utility bonds, and if the bonds are not readily disposed of, to give residents of the district served an opportunity to subscribe to the issues.

Willapa Electric Company, Raymond, Wash.—The Superior Court of Thurston County on March 31 reviewed the order of the Public Service Commission of Washington, requiring the Willapa Electric Company to construct and maintain an extension of its railway. On April 4 the court ordered that the order of the commission be set aside. The requirement of the commission that the railway build certain extensions was referred to in the ELECTRIC RAILWAY JOURNAL for March 5, page 474.

Power Houses, Shops and Buildings

Berlin (N. H.) Street Railway.—The Berlin Street Railway within the next month will build a new carhouse.

Charleston Interurban Railway, Charleston, W. Va.—The Charleston Interurban Railway has purchased nearly an entire block of city property and is planning the erection of a modern terminal. T. S. Clark, attorney for the company, states that the company has outgrown its present station and that the new improvement will tend to eliminate a lot of congestion which prevails under the present system of operating cars.

Cincinnati (Ohio) Traction Company.—Bids for electrical equipment of substations which will be built by the Cincinnati (Ohio) Traction Company, before the contract for power with the Union Gas & Electric Company becomes effective were submitted to the office of the Director of Street Railways, recently for approval. The Westinghouse Electric Company bid $380,000 while the General Electric Company asked $409,925. It is planned to have the substations ready for operation on Sept. 1. There will be seven substations—Price Hill, Norwood, Hartwell, Chester Park, Cumminsville, Depot Street and Twelfth and Walnut Streets.

Professional Note

The Harry M. Hope Engineering Company, Boston, Mass., has established offices in the Dominion Express Building, Montreal, to handle its Canadian business. George W. Saunders, formerly with S. Pearson & Sons, London, is Canadian manager.

Trade Notes

The Rome Wire Company, Rome, N. Y., has added weatherproof wire to its manufacturing schedule, and its new weatherproof wire mill is now completed and in operation.

The Green Fuel Economizer Company about May 1 will move its general sales office and engineering department from 90 West Street, New York City, to the factory at Beacon, N. Y. The New York sales office will remain at 90 West Street, and Mr. Brinkerhoff will continue in charge.

The Esterline Company, Indianapolis, manufacturer of graphic recording instruments, announces the appointment of Walter W. Gaskill, 141 Milk Street, Boston, as New England representative of the company.

The Stoker Manufacturers' Association, J. G. Worker secretary, Phoenix Manufacturing Company, Eau Claire, Wis., has changed the date of its annual meeting to June 14, 15 and 16 at the Red Lion Inn, Stockbridge, Mass.

The Batterman-Truitt Company, 736-8 West Monroe Street, Chicago, has negotiated a lease covering additional floors in the Gordon Building, 730-38 West Monroe Street, tripling its facilities and equipment for the manufacture of ventilating fans and blowers.

Morton Manufacturing Company, Chicago, Ill., announces the appointment of Frank N. Grigg as southeastern sales manager, with offices at 630 Louisiana Ave., Washington, D. C., to handle the sale of the company's entire "Acme Line" of railway appliances. C. H. Kadie, formerly master mechanic of the Southern Railway, is associated with Mr. Grigg as sales representative.

American Di-Electrics, Ltd., New York City, manufacturers and engineers in the field of insulation, are moving to larger quarters at 71-73 West Broadway on May 1. John P. Rockwood, metropolitan distributer, is also moving to the same address. The change will enable the company to enlarge its lines and deal in all kinds of insulation in addition to those produced in its own factories. The company's Pittsburgh agent, the Electrical Engineering & Manufacturing Company, has also recently moved to larger quarters at 907-909 Penn Avenue, Pittsburgh.

Sanford Riley Stoker Company, Worcester, Mass., announces that the sales management for Riley underfeed stokers and Murphy furnaces has been concentrated under one head. William Pestell, formerly Western sales manager with headquarters at Chicago, now becomes sales manager with headquarters at 1226 Woolworth Building, New York City. W. L. Bigelow becomes district manager of the Pittsburgh territory, while C. Lincoln Smith goes to Cincinnati in the same capacity. To serve better the territory in and around Kansas City, the F. M. Beeson Machinery Company, 308 Mutual Building, Kansas City, has been appointed sales agent for both Riley stokers and Murphy furnaces. Sales in Denver territory will be handled by the Stearns-Roger Manufacturing Company, 1718 California Street, Denver. The Boston, Buffalo, Cleveland, Detroit, Chicago, and St. Paul offices remain unchanged.

New Advertising Literature

Pumps.—"Ten Years' Progress in Water Works Pumps" is a 100-page publication of the De Laval Steam Turbine Company, Trenton, N. J.

Stokers. — The Files Engineering Company, Inc., Providence, R. I., is distributing a sixteen-page booklet covering its hand-operated Files stokers.

Bond Welder.—The Ohio Brass Company, Mansfield, Ohio, as general distributer, is circulating a folder on the Wilson Plastic-Arc Rail Bond Welder.

Steam Turbines. — General Electric Company, Schenectady, N. Y., has issued bulletin No. 42,201-B, superseding No. 42,201-A, on Curtis steam turbines of 100-kw. to 3,500-kw. capacity.

Outdoor Switching. — "The Skeet Switch and Skeet Transformer Station," an eighteen-page publication has been issued by T. J. Johnson, Jr., Electric and Gas Building, Atlanta, Ga.

Hydraulic Valves.—Bulletin No. 52 has been issued by the Wellman-Seaver-Morgan Company, Cleveland, entitled "The W-S-M Balanced Plunger Hydraulic Valve," a new product developed by the company.

Wood Block Floors.—The Jennison-Wright Company, Toledo, Ohio, has issued a booklet describing and picturing installations of "Kreolite" wood flooring blocks for machine shops, car shops, loading platforms, roundhouses, etc.

Commercial Possibilities in Africa.—National Foreign Trade Council, Hanover Square, New York City, has issued for distribution a booklet dealing with the "Commercial Possibilities of the Union of South Africa."

Hammer Drill.—Chicago Pneumatic Tool Company, 6 East Forty-fourth Street, New York City, has issued bulletin 639, on its BQ-46 Hammer Drill which is primarily adapted for demolition work such as removing pavement along rails and between ties.

Foundry Practice.—The Farrell-Cheek Steel Foundry Company, Sandusky, Ohio, has just issued a complete handbook on foundry practice which describes and illustrates each operation required in making a casting, the same casting or pattern being used throughout.

Fire Fighting and Safety Devices.—American-La France Fire Engine Company, Inc., Elmira, N. Y., manufacturer of fire-fighting equipment and safety devices, has issued edition No. 6 of its 205-page catalog on "Fire-Fighting Equipment, Accessories and Supplies," and also edition D of its catalog specifically devoted to safety devices.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, May 7, 1921 *Number* 19

Rigid Periodical Inspection Should Be Insisted Upon

THE evils of haphazard inspection, of inspection which is not thorough and rigid, was brought forcibly to attention the other day while details of a certain truck were being examined. One of the motor bearings had collapsed and broken and was on its way out of the housing in pieces. It was caught just in the nick of time by the accident that this particular truck, out of a large number, was selected to be removed for the study being made. Most properties, and this one is doubtless no exception, have a regular schedule for inspection, but since inspection is by human beings, mistakes will be made.

In this case, something was overlooked which points to the necessity of equipment superintendents and master mechanics insisting upon not only periodical inspection but rigid and thorough inspection. The mechanical side of the economies and safety of operation of rolling stock is up to the equipment men. Constant inspection to catch every fault before it becomes serious is the basis of this part of the business. This also emphasizes to the executive the value of a well trained engineer in charge of the equipment. He is always worth more than most companies can afford to pay him.

How Some Proposed Taxation Would Affect the Industry

ONE of the questions which the present Congress will have to settle is that relating to future taxation. A repeal of the excess profits tax seems to be generally demanded, partly because of its complexity and partly because, with present business conditions, it is so much less productive than during the hectic years of business ended by 1920. In its place the substitutes principally recommended have been the sales tax, an increase in the normal tax, as levied on corporations or individuals or both, and a modified tax on corporation profits.

Various forms of "sales tax" have been suggested, but a common form, if not the most common form, provides a tax of 1 per cent each time the merchandise is sold, whether in the course of the manufacture of manufactured articles, or in the course of the distribution of merchandise among wholesalers, jobbers and retailers. Thus, in any merchandise which passes through several hands, the tax would be added each time, but some of the advocates of the sales tax have estimated that this cumulative tax would not amount to more than an average of about 3½ per cent on the cost of the article to the ultimate purchaser. It is generally expected also that the tax would not be laid on sales of certificates of ownership, such as stocks, bonds or notes, or on payment for services, either personal or those furnished by utilities, or on sales of real estate.

The discussions on this tax at the recent meeting of the Chamber of Commerce in Atlantic City as well as discussions on the tax elsewhere have disclosed a considerable diversity of opinion on its merits. Generally speaking, the tax has been favored by the financial, manufacturing and retail interests of the country with certain notable exceptions, however, and has been opposed by the agricultural and labor interests, and others who have proposed other taxes in its stead. This, in fact, is the position of Secretary Mellon, whose recommendations made public May 2 include increases in corporation taxes, increased stamp taxes and licenses for the use of automobiles.

As between the excess profits tax and the sales tax, the interest in the matter by electric railway companies so far has been largely academic. Very few electric railway companies have been affected by the excess profits tax, because they had no excess profits, and the nature of their services would exempt them from the sales tax as usually proposed. In fact, it would be impossible for the electric railways to collect from their patrons 1 per cent on a 6-cent or a 10-cent fare, and it is the understood purpose of the sales tax that it should be paid by the consumer.

The effect on electric railway companies of an increase in the normal tax or of an added corporation tax on net profits would depend entirely on the form and extent of the latter tax. The most serious possibility would be any considerable tax on undivided surplus. No matter what one may think of the principle of taxing the undivided surplus of ordinary corporations, such a policy if applied to the utilities would be detrimental, both to them and the public. It is only by the use of this surplus to finance essential improvements that many companies during recent years have been able to serve their growing communities at all adequately. From one point of view such a policy has been hard on the stockholders, but they have had the satisfaction of knowing that their property was continuing to fulfill its public functions and that, in some critical cases, this plan was better than to borrow money for extensions at the very high interest rates which would have to be paid for it during these abnormal times.

Should Periodical Re-examinations of Employees Be Held?

IN THE issue of this paper for Dec. 18, 1920, there was an editorial reference to the necessity for physical and mental examination of prospective employees. This was in connection with a forthcoming report of the committee on personnel of the American Electric Railway Transportation & Traffic Association. Since that time some of the larger electric railway companies have extended the scope of such examinations with results so satisfactory that an "experience meeting" in connection with the next convention should help to impress on the railway representatives the importance of giving more attention to this feature of successful management.

It is an easy matter for a railway company to require all prospective employees to submit to a physical and mental examination before entering the service. This affords an opportunity to weed out undesirables before they have come under the protection of a workmen's compensation act and without giving them a chance to endanger the lives of passengers. It is an entirely different matter to carry out a policy of re-examination of employees after they have been working for some time. This involves the question of what to do with an old employee who has been found wanting in some serious particular as to physical requirements. Shall he be carried on a pension roll, or transferred to some less hazardous occupation, or summarily dismissed?

Adherence to a high physical standard undoubtedly would be an advantage to the riding public, to the company and to the employee himself. But if in the carrying out of such a policy a workman faces discharge after twenty or thirty years of faithful service, it is worth while to consider what can be done. Few railway companies are sufficiently prosperous to be able to set aside an adequate pension fund for employees. In some cases where the employees are strongly unionized objection has been raised by their representatives to the establishment of a company pension plan. This probably is due to fear that the men would be won over to a company organization. The alternative plan of finding work for the disabled employee in some other department would be all right until all possible jobs were filled. The last alternative of dismissing the workman meets with objections from the humanitarian standpoint, yet it is one which will have to be faced in a serious recognition of the duty owed to the public of furnishing safe men as well as safe equipment. A defective wheel or brake would have to be discarded. What about the defective employee? The subject opens up a broad field for discussion.

Is It Better to Cut Wages in a Lump or By Installments?

THE Boston Elevated Railway employees have fallen in line with those of Cleveland in accepting without strife a decrease in their basic rates of pay. Conditions governing the decrease, which amounts in all to about 10 per cent, call for its being made in installments. For men on the surface lines in service more than one year, in other words for those in this class receiving the maximum pay, the hourly wages will be decreased 2 cents per hour on July 1 and 3 cents per hour additional on Jan. 1, 1922. This corresponds to a total reduction of 7.14 per cent from the present rate of 70 cents. Elevated motormen and guards have reductions of from 4 to 6 cents per hour, also in two installments of six months each.

It is this method of reduction which makes the Boston program of especial interest. Those who favor the plan will doubtless argue that the division of the reduction into two installments more easily permits the employee to adjust his scale of living to his income, hence that the plan is a wise one. Those opposed will probably declare that where a reduction in wages is no more than in the cost of living no adjustment by the employee in his scale of living is necessary. Such changes, they argue, should be definite for a definite time and future periods can very properly be cared for on their merits whenever there is a material change in living costs.

The more general practice of using the immediate settlement plan of adjustment seems to indicate its greater popularity among railway men. But this is not conclusive, as it is not known that the installment plan was thought of and considered in other cases. It is worth examining.

Another interesting departure in wage agreements is the recent arbitration award in the case of the New York pressmen, handed down this week and accepted by both sides. This award calls for a reduction in wages of about 12 per cent and is made retroactive to April 1. Retroactive wage increases are common and there is no reason against retroactive reductions, but they are not frequent. The men expect to pay back the sum thus awarded by deductions from their payroll during May.

Philadelphia Co-operative Spirit Carries Down as Well as Up

THE present problem of effecting necessary reductions in wages, no matter by what detail it is actually carried out, places a test on the satisfactory nature of the relations of management to men on electric railway properties which is probably as severe as any which has ever been applied to this relationship. There has already been comment in these columns on some cases which have arisen, Cleveland being an outstanding one. Other recent cases are Altoona, Pa.; Albany, Ala.; Hudson, N. Y.; Saginaw, Mich., and Boston, Mass., commented on above. Another case of interest to the industry is Philadelphia, where wages have been determined according to contract with the men by averaging the rates in effect in Buffalo, Cleveland, Detroit and Chicago. The method of computing the Philadelphia wage is of course a mere mechanism and may be open to the criticism of "letting George do it," but it seems to have worked successfully.

The manner in which the men are reported to have accepted this reduction, voluntarily, is an indication, possibly, of their sense of partnership in the enterprise, certainly of the understanding of the necessity for and justness of the decrease. The way was paved for this present reduction, however, last summer when the last increase went into effect. Mr. Mitten warned the men at the time that this was all temporary and that they should consider the increase in income as "velvet" and store it away, not establishing a scale of living based on the new wage, for this was bound to come down soon.

Each property will develop its own relations in this respect largely as the result of the individual characteristics of the men on both sides. Indications are that these relations are improving all over the country, in spite of the strain on them caused by the past several years. Philadelphia's record of ten years of industrial peace, recently celebrated there at the tenth anniversary of the successful co-operative plan on the P. R. T., is one instance to prove this.

Has Paris Solved the "Incentive" Problem in Railway-City Contracts?

IT IS universally admitted that the most pressing problem before both the electric railway and its community today is to find a means of combining an attractive rate of return to the investor with a continued growth in the usefulness of the transportation system. The service-at-cost and public trusteeship plans are steps in that direction, but many of these agreements are thus far on the wrong side of the ledger and on the wrong side of the traffic count. If, then, the present agreements do not look like the last word on the subject, what can we learn from those who have had longer experience with contracts of that kind?

Fortunately, a most interesting experience in this direction has come to hand through the changes now taking place in the Paris metropolitan district. Here contracts in which fares went up or down according to traffic density were made as early as 1910. However, it seems that they failed the public before the war in producing the expected enlargement and betterment of service and that they failed the company during the war in proving flexible enough to meet the situation in wages and materials, brought about by the war. Then, too, the division of the territory among six companies, although only one dominated Paris proper, was a hindrance to progress.

It is not necessary to set forth here the detail terms of the superseded contracts and the agreement with the new State-backed operating company, as these are presented elsewhere in this issue, but it is pertinent to see what weaknesses were disclosed during the operation of these early agreements. From the public's point of view, the weakness lay in the fact that the company's rate of return depended too closely upon a definite and undesirable density of traffic. Therefore, as a business proposition, the company hesitated to do anything which would impair this density of traffic, whether in extensions of routes or shortening of headways. From the company's point of view, conditions had reached the point where the rate of return was no longer insured by bearable increases in rate of fare. The mere relinquishment of the city's percentage of gross earnings would have been but a drop in the bucket.

The community, which includes the districts contiguous to Paris, therefore found it necessary to devise a plan whereby the profit possibilities of the transportation system would be made secondary to its usefulness. Obviously, private capital could not be expected to run a transportation system on that basis. On the other hand, direct government ownership and operation did not offer any definite guarantee of efficiency. So it comes about that the plan evolved is one which places the capital invested in the leasing company upon the same plane as a government bond and elevates the management and the employees to the position of supreme responsibility for results. Now what are the results expected? Does the government expect that there shall necessarily be a surplus big enough to meet the cost of operation and all overhead, including the sinking fund payments to amortize the securities of the superseded companies and 6 per cent to the shareholders in the new company? No. The mark of efficiency will be primarily in enlarging the usefulness of the undertaking—in getting more riders; and secondarily in taking advantage of any improvements that will lower costs but not dec The govern not expect that the most able management will be able to show a surplus for some years to come, but it is determined to make the transportation system as valuable to the community as possible without incurring extravagance. Hence there is seen a system of awards based upon both greater usefulness and technical progressiveness.

In sum, the outstanding features of this contract, in contrast with the usual service-at-cost plan, are that the rate of return will not have to come out of more revenue from less riders at higher fares, usefulness of the mass transportation system being predominant, and that a reward for attaining this enlarged usefulness will go to those whose brain and brawn are most closely responsible for results.

Quotation from the Federal Electric Railways Commission Report

No. 19

THE commission is not pessimistic as to the future. The electric railway problem admits of a satisfactory solution, once the elements that compose it are made known and the principles of ordinary economic and business common sense are applied.

The duty both of the public authorities and of those who control the electric railway enterprises of the country is plainly indicated. The time has come for stable and satisfactory settlements of traction difficulties.

The commission can go no further than to point out the principles upon which readjustment should be based. The task is really that of the state and local authorities upon the one hand and of the companies upon the other. Failure to rehabilitate the industry and the service is possible only if those upon whom the responsibility rests fail to undertake the work or pursue it in a spirit that makes settlement impossible.

Use Judgment in Welding Reclamation

EVERY one knows of the great importance and value of welding in the reclamation of electric railway equipment. Welding has virtually saved the lives of many companies, both in its ability to keep the wheels turning and more permanently in the fine economies effected. During the war the inability often to get new equipment at any price justified the use of the welder to an extent that would not be considered good practice from the standpoint of either safety or economy in normal times. Times now are perhaps not normal, but conditions have eased sufficiently so that there is no longer any need to carry the reclaiming work to the extremes that were formerly necessary. The master mechanic particularly should check up on the welding work he is having done with two considerations in mind, namely, safety and cost. The more important of these is safety, for even though an economy may be shown it is inadvisable, at least with the present limited knowledge of the art, to weld at vital points such parts as car axles, flanges of wheels used in high-speed service and other parts that are subject to high strain and the failure of which might mean a serious accident.

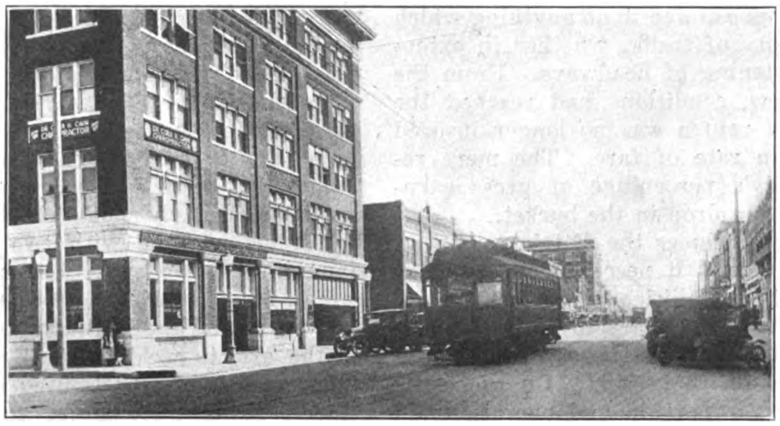
The principal points of breakage of axles are between the gears and hub and between the journal bearing and hub of the wheel. These points are the vital points of a car axle, and as these parts cannot be increased in size above normal, because of the necessity for a machined finish at these points, it appears inadvisable to attempt welding repairs at such locations. Until there is more definite knowledge about the molecular effect of welding upon the metal greater caution may well be used.

While one's pride may be flattered by the statement that "we never scrap anything," still it is a very easy matter to be fooled about the relative economy of welding a broken or worn piece of equipment versus the scrapping and replacing it with a new one.

The Baby Electric Railroad Is a Buster

Recently Electrified Short Railroad Line in Northeastern Oklahoma Immediately Proves Advantages of Electrification—Gives Excellent Freight and Passenger Service to Zinc and Lead Mining Communities—Contemplates Early Extension to Much Larger System

WHAT is probably the latest member to enter the electric railway field is the Northeastern Oklahoma Railroad Company, located in the northeastern corner of the State of Oklahoma and feeding what is probably the largest lead and zinc field in the world. As was noted three or four months ago in this paper, this railway started electrical operation about the first of February this year. It had previously been a steam road, which had been operating for about eight years, but whose service had been growing more and more unsatisfactory to the mining companies. During the latter part of 1919, in order to purchase the steam railroad property, the Northeast Oklahoma Railroad Company was formed, largely from mine operators and business men in Miami, the principal terminus and location of the main offices of the company. J. F. Robinson, president of the company, is also president of the Commerce Mining & Oil Company, the largest mining group in the Miami field. The road was formerly known as the Oklahoma, Kansas & Missouri Railroad.



MAIN STREET, MIAMI, SHOWING CATENARY OVERHEAD WITH CONCRETE POLE CONSTRUCTION

The main office of the company and a passenger waiting room are in the large building in the foreground

The accompanying map gives some indication of the character of the layout of this road. The entire area shown on this map is practically as flat as a table top and twelve or thirteen years ago was Indian farm land of no particular importance. About 1911 lead and zinc were discovered and developed at and around Commerce, though there were some little developments north of that. It was at this time that the Oklahoma, Kansas & Missouri Railroad was started to handle the traffic from this new mining field to the St. Louis & San Francisco and the Missouri, Oklahoma & Gulf (now the Kansas, Oklahoma & Gulf) Railroads at Miami. During the world war the demand for lead and zinc caused a rapid expansion of this field, until at the close of the war there were some 280 lead and zinc mines operating here. Immediately these mining towns took on a new importance, for these are mining towns in the truest sense and remind one very much of the early days of Leadville, Cripple Creek and other centers of mining activity, busy with the creation of considerable new wealth. Practically all of these mines are located on land whose mineral rights have been leased from Indians, who hold title to the land under government supervision. Some of the Indians had fabulous incomes during 1917, 1918 and 1919, tales of $20,000 to $50,000 per month being not unusual. The writer had the opportunity of going over this interesting territory in March to inspect the railroad and its community. Mining activity has, of course, now ceased in many of these mines and here lie the large groups of frame houses or shacks, practically all one-story in height, making up these mining towns, with populations which are ever variable.

Miami itself has a population of about 8,000 and North Miami of 600. This is rather stable population. If a normal figure can be set on the population of the other towns, it is about as follows: Commerce, 3,500; Tar River, practically a part of Commerce, 4,000; Picher, 10,000; Century, 1,500, and Treece, a town just above the end of the spur which reaches up into Kansas, 3,000. The officials of the road figure on a population of about 45,000 on the line and in the contiguous territory. From this, records show a passenger business of about 75,000 per month.

As this territory grew, the old steam road extended its lines to many of the mines, as did also the Miami Mineral Belt Railroad, which came in from the east to tap the field. This road also has connection with the Frisco and K. O. & G., as shown.

Miami is a Western town which would surprise most people who have not been to Oklahoma. It has wide streets, 90 per cent of which are paved. It has excellent schools, is the home of one of the state mining schools, has one of the best hospitals in a radius of several hundred miles and is the trading center for a large area with which it is connected by excellent roads made from the chat which is the refuse from the lead and zinc mines. Mountains of this chat, by the way, surround each of the mines and give one the impression that the topography is not so flat after all. This chat, too, forms one of the sources of revenue for the company, for it can be secured and hauled away at very low cost for use in paving and in concrete work. Miami is also the home of a new industry of tripolite products, used for polishing purposes in the metal trade and also for facing casting molds. The great Krupp works in Essen, Germany, are said to secure their tripolite from the Miami field.

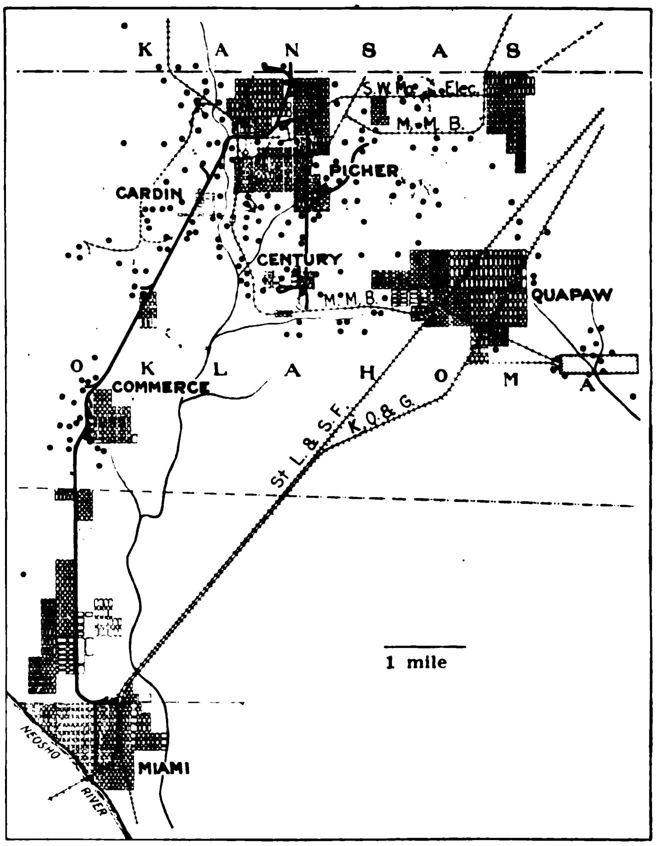
As to the road itself, the original equipment consisted of four steam locomotives, six passenger cars, used as trailers on the steam trains originally and retained as emergency trailers, and four General Electric gasoline-electric passenger cars, in addition to freight equipment described later. The steam locomotives are being put into shape to sell, except that one will probably be held to operate work trains in case of making any extensions to the system, as planned, in the next five or six years. The four gasoline-electric passenger cars are also being repaired and overhauled for sale.

The entire system has been overhauled and track regraded and rehabilitated by the new management. The rail is standard 70-lb. rail on red and white oak ties, some of which are treated. The ballast is of the ever-present chat and averages a depth of 12 in. under the tie. The maximum grade in passenger service is 1.26 per cent; in freight, 1.05 per cent; the maximum curvature on the main line is 8½ deg. and in yards 16 deg. All rail joints are bonded with 0000 strand bonds and cross-bonds of the same capacity are placed every thousand feet. The entire line is constructed on private right-of-way varying in width from 150 ft. at stations to 40 ft. at other points to suit conditions.

Necessary sidings, most of which are at least 1,500 ft. long; spurs, wyes, etc., were in the original layout or have been added so that the railroad can adequately take care of all necessary traffic.

The overhead, and all of the electrical work, is naturally new and has been added by the present management. The overhead construction, some illustrations of which are shown herewith, was designed by the Ohio Brass Company and is of the flexible catenary type. It is an example of how to put up overhead. The distribution scheme, with a substation at Picher and with one at Commerce, consists of a 500,000 circ.mil Roebling feeder cable installed the full length of the main line electrification. A 0000 grooved trolley, hard-drawn copper, furnished by the Standard Underground Cable Company, forms the contact wire and is suspended from the catenary by hangers spaced 15 ft. apart. The feeder is attached to the trolley wire every 1,000 ft. and lightning arresters have been placed at this same spacing.

Western red cedar poles have been used, spaced 120 ft. on tangents, and on curves spaced to suit the curvature. These poles have been butt-treated, with hot application and then cold application, both brush applied. All poles are set 6 ft. in the ground, whether 35 ft. or 40 ft. in length. In the city of Miami, in place of wooden poles, reinforced concrete poles have been used both as a feature of artistic appearance and to give necessary strength. The transverse spans on Main Street, shown in one of the accompanying illustrations, are 60 ft. long, and in order to hold the overhead as rigidly as desired are under very heavy strain. The concrete poles used here are what are known as the 1,500 class furnished by the Massey Reinforced Concrete Products Company. They are 33 ft. long, with a 15-in. butt and 5-in. top, round, and reinforced the entire length with six longitudinal rods and also with annular rings of steel.

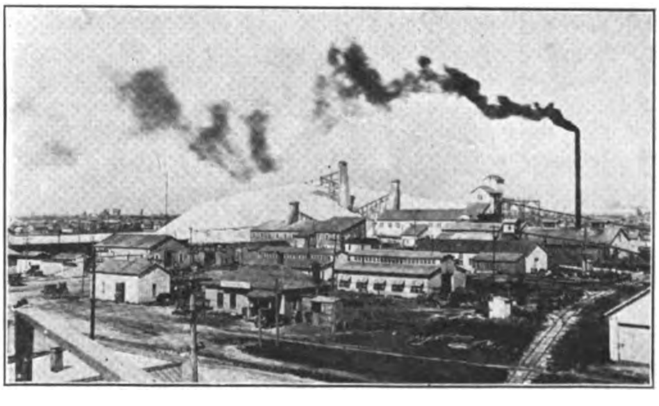


MAP OF THE NORTHEASTERN OKLAHOMA COMPANY—THE ORE LINE (INDICATED BY HEAVY BLACK LINES)

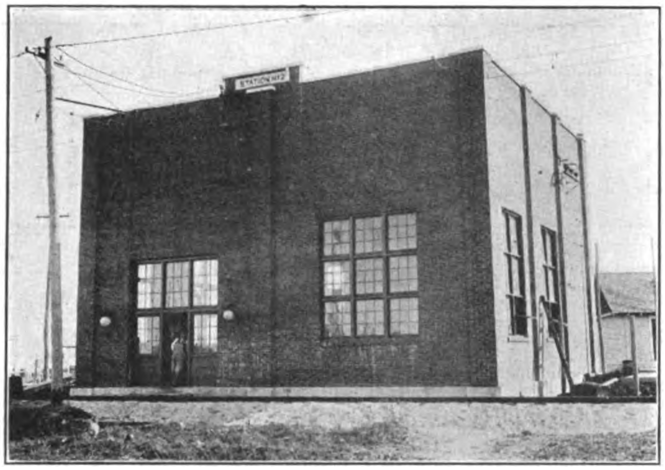
A telephone line runs the entire length of the main line of the road. To reduce interference to a minimum, this telephone line has been placed on the inside end of the cross-arm, the feeder being on the outside end; in addition to this, the telephone line is transposed every third pole.

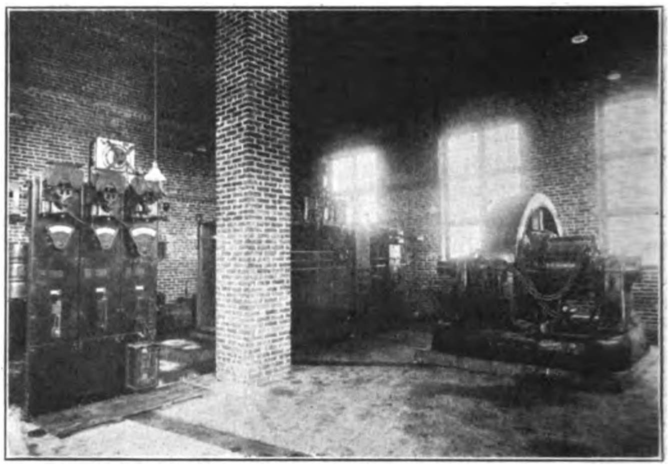
Electrical energy is purchased from the Empire District Electric Company at 33,000 volts, three-phase. In order to have equipment furnished on time, it being found impossible to get satisfactory shipping dates from manufacturers on new equipment, the substation equipment was purchased from the Cincinnati & Columbus Railway. Only one substation is now operating, but the

VIEW SHOWING FREIGHT SIDINGS AND OVERHEAD. NOTE THE HUGE "CHAT" PILE AT THE RIGHT



A TYPICAL MINE, AT PICHER, WITH THE NUMEROUS ONE-STORY MINERS' SHACKS IN THE DISTANCE


OUTSIDE SUBSTATION NUMBER 2—AT PICHER—NOW OPERATING


INSIDE SUBSTATION NUMBER 1—AT COMMERCE—NOT YET OPERATING

other will be put on the line very soon. The one operating is located at Picher and contains one 400-kw. G.E. converter, fed from three 145-kw. General Electric transformers. The other substation, located at Commerce, contains two 400-kw. General Electric converters and is being equipped with three 250-kw. new Pittsburgh transformers. The original transformers, from Ohio, had been used at 16,500 volts, and it proved desirable to make a new installation for satisfactory operation at the higher voltage rather than try to use the old transformers.

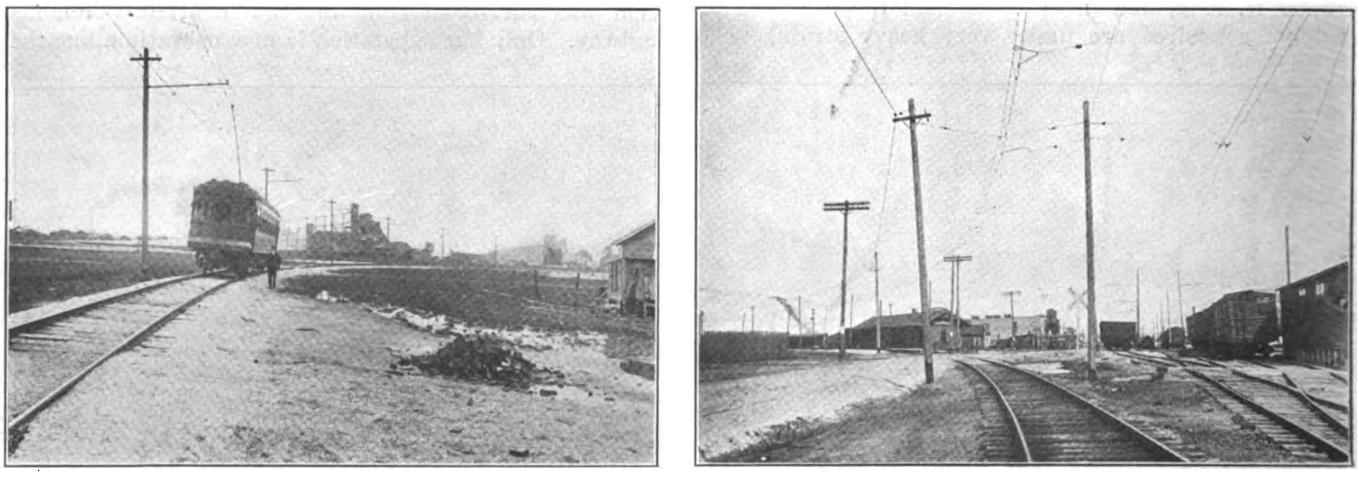
Both stations are being equipped with Westinghouse electrolytic lightning arresters. Both are equipped with Burke remote-control, high-tension switches.

The rolling stock of the company was likewise purchased from other railways, in order to secure it on time. Two large motor cars for passenger service were purchased from the old Blue Grass Line at Nashville, Tenn. These are equipped with four 100-hp. G.E. 205 motors and are of the interurban high-speed type. Four smaller cars, purchased from the Cincinnati & Columbus Railway at Ohio, are used for lighter traffic. These are equipped with four 50-hp. G.E. 57 motors. The road also has one Westinghouse-Baldwin 50-ton locomotive and the former freight equipment of the steam road, namely, ten gondolas, three flat cars, one ice car, two cabooses. The third caboose inherited from the former management has been converted into a line car. There is also a motorized package freight express and baggage car which is used for handling small package shipments.

The regular schedule calls for sixty-six passenger trains per day over the line and freight service as demanded. The passenger traffic is largely composed of miners, many of whom commute daily from their homes in Miami to the mine, and also an interchange of miners from the other towns back and forth. The average passenger car-miles per day are something over 850. The exact figures for the month of February were 24,922. Already the officials of the road have some statistics which show the advantage of electrical operation. Measured at the substation, and including station loss, conversion, etc., the watts per car-mile are estimated to be about 3.87 in passenger service. At the present cost of electrical energy, this figures about 7.3 cents per car-mile and about 0.7 cents per passenger-mile. With the former operation of motor cars, the fuel cost alone was about 18 cents per car-mile.

On the freight side February showed 2,088 loaded car-miles and 2,196 empty car-miles handled with a locomotive mileage of 629. On a basis of 40 tons per car dead load, with the weight of the car not included, the cost of coal in January figured $3.50 per car, whereas the cost of electrical energy for February figured $1.27 per car.

The passenger traffic is handled on a fare base composed of 5-cent units, with, however, a 10-cent minimum fare. The fares are, figured from Miami: To Com-


TWO VIEWS ON THE RIGHT-OF-WAY SHOWING OVERHEAD CONSTRUCTION ON CURVES AND GIVING SOME IDEA OF THE NATURE OF THE LINE

merce, 4 miles, 10 cents; to Blue Goose, 7 miles, 15 cents; to Cardin, 8 miles, 20 cents; to Picher, 10 miles, 25 cents, and to Century, 13 miles, the end of the main line electrification, 30 cents. A commutation book, with 100 5-cent coupons, is sold for $4. Only about 10 per cent of the fares are paid by the use of these coupons, however.

The business of this road, as seen, depends almost entirely upon the activity of the lead and zinc industry, and particularly of the Miami field which this road feeds. Traffic in the latter part of 1920 and the early part of 1921, for instance, is considerably off from what could be considered normal. Of course, it is probably never expected that the war-time conditions of two twelve-hour shifts of seven days in the week will reappear. Road building should give some impetus, however, to traffic in this field on account of a possible demand for chat.

More than 4,000 carloads of this chat were shipped over the lines of the Northeastern Oklahoma Railroad alone during 1920.

But there are opportunities for diversifying the business of this railroad near at hand. Some 150,000 acres of coal land lie southwest of Miami; large coal lands also lie near Columbus, Kan., just to the north of the present lead and zinc field. As this territory becomes more and more developed by lease from the Indians or as the Indians obtain the right to sell the land and it becomes more attractive to outside capital there is a large territory which has no railroad facilities at all and which will offer opportunity for this newest addition to the electric railway field to expand. While no definite plans have been made, yet the management of the road realizes the situation and is awake to the possibilities of expansion, which it will probably undertake during the next four or five years.

And all of this expansion will be under electric traction, for the operating personnel of the road is thoroughly convinced of the efficiency of electrification. Compared with operation under conditions prevailing previous to electrification, the certainty of schedule, the decreased running time, the savings in power and other operating expenses, the general increased operating efficiency of the personnel itself are all features which have come on account of electrification and appeal to the management of the road.

Baltimore Tries Loading Platforms

Experimental Platforms Have Now Been in Use for Several Months—Results Show Their Value for Relieving Congestion and Also for Speeding Up Traffic—Thirteen Installed So Far

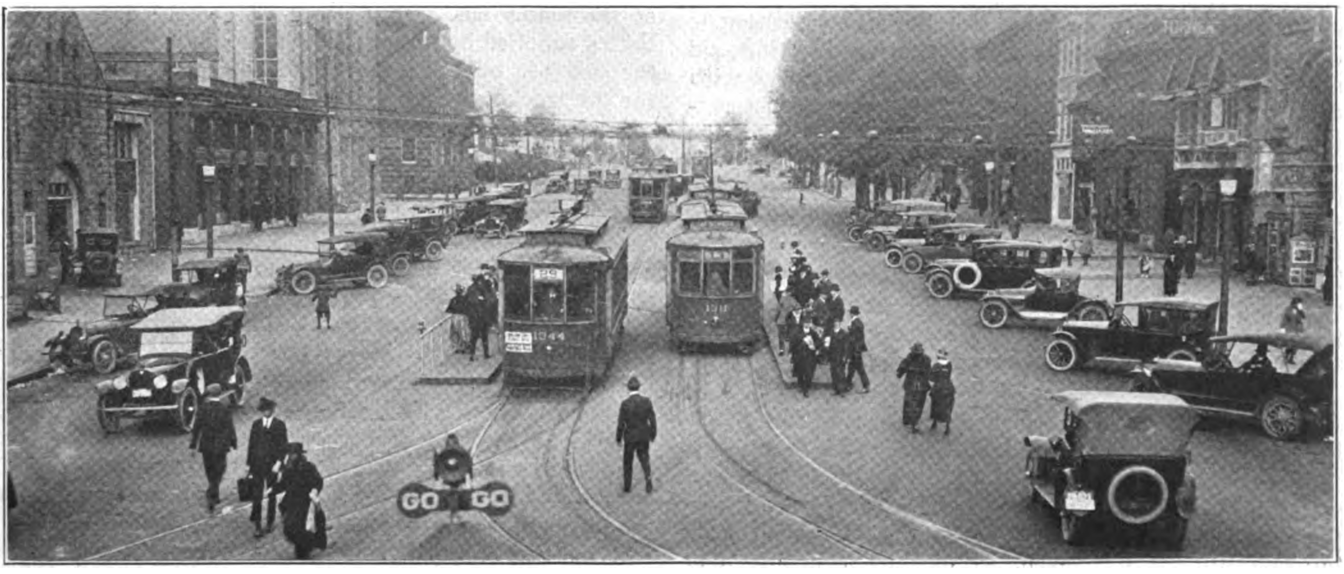
SOME months ago the subject of loading platforms was actively discussed in Baltimore between the public authorities and the officials of the United Railways & Electric Company and an experimental pair of platforms 5 ft. wide, 100 ft. long and 9 in. high were erected at North Avenue, at its intersection with Charles Street, which at this point is a thoroughfare 110 ft. wide between curbs, with the car tracks located in the center. On this pair of platforms rigid pipe railings were installed. These railings were carried 3 ft. above the level of the platform.

The results attending this original installation were very satisfactory, from the viewpoint of safety and convenience of passengers, from the standpoint of control of traffic by the police department and because of operating advantages to the railway company. Thereafter additional platforms were put in, until at the present time thirteen have been installed. A number of these were put in at the direct request of the Police Department.

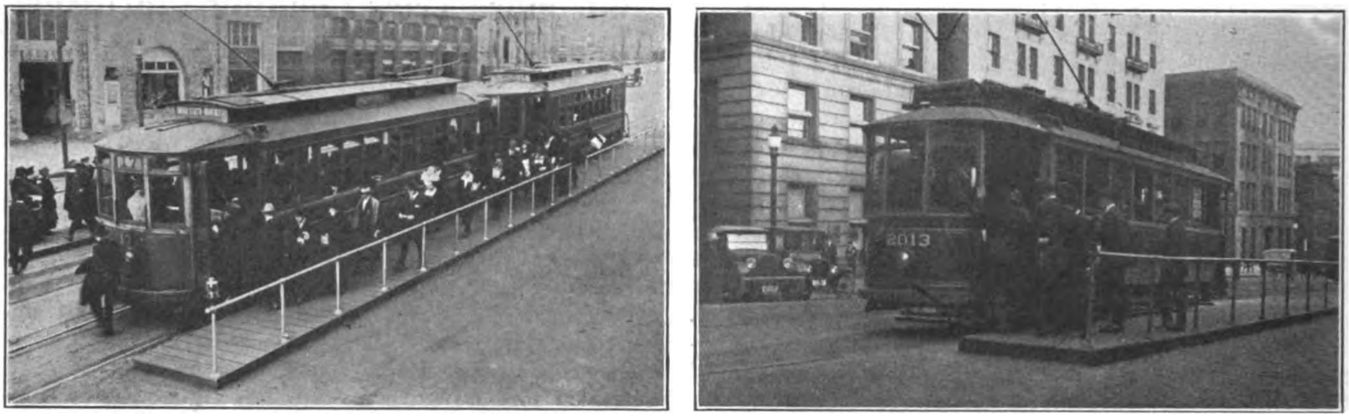
Queue loading is recognized as a very desirable and an effective aid to the rapid handling of passengers onto a car. One very satisfactory development from the use of these loading platforms has been what might be called automatic queue loading, as the comparatively narrow platform, with chains or rails on its outer edge, by its very construction promotes the unconscious adoption of the queue form of loading.

Plans were laid also for the installation of quite a few more platforms, but the Fire Department objected to their being put down in the narrower streets, because it felt that it would interfere with the operation of fire apparatus.

As a result of the Fire Department's objection the railway was unable to put platforms in at a number of locations where a study of conditions at the present time indicated their desirability and the Police Department had requested their installation. The co-operation of the Police Department has been of great assistance in successfully working out the plan, and the results from



LOADING PLATFORMS ON NORTH AVENUE AT CHARLES STREET



AT LEFT, PLATFORMS PRODUCE AUTOMATIC QUEUE LOADING. AT RIGHT, PLATFORM ON LIGHT STREET AT BALTIMORE

the public and operating standpoints have been very satisfactory.

On the original installations pipe rails were erected, but latterly chains have been used attached to upright stanchions, instead of the continuous pipe railing. This was found to be more desirable, because occasionally automobiles run into the platforms, and where the stanchions are connected by chains less damage is done than where a rigid rail extends the whole length of the platform. On the platforms and safety zones the Police Department supplies and maintains red oil lanterns during the night hours. On the ends of the platforms diagonal black and white stripes, similar to those used on railroad crossing gates, have been painted.

At a number of places where the company has been unable to get permission to install platforms because of the narrow streets isles of safety have been established. These were originally constructed with stanchions and iron pipes, making them rigid, but, for the reasons stated above, piping has been abandoned and the stanchions are now joined by chains. In some locations these stanchions had been in use before platforms were introduced, but recently the number of isles of safety have been materially increased.

A special study of traffic conditions at each location was made before platforms were laid down, and where practicable they were located around the corner from congested streets, this necessitating in some instances changing from the standard near-side stop to a far-side stop. This has been of value in relieving congestion.

The platforms are constructed of heavy planking laid on wooden sills and fastened to the street surface with drift pins. Consideration has been given to constructing them in a more permanent manner, with concrete curbs, either filled in with crushed stone or with an all-concrete surface, but for the present, until the experiment has gone further or the present platforms begin to wear out, no change will be made.

The accompanying illustrations indicate the method of locating these platforms and the additional safety which this improvement in the street car facilities of Baltimore provides for the traveling public.

Foreign exchanges record the inauguration of a trackless trolley line 1¼ miles in length and with four buses in York, England. The Bradford Corporation Tramway, which already has a number of these cars, has in contemplation a six-wheel trackless trolley bus, with seating capacity of fifty-seven, as well as some one-man buses with seating capacity of thirty each.

Trackless Trolley Demonstration

IN VIEW of the general interest in trackless trolleys, principally because of the present high cost of railway construction and competition from the motor bus, a practical demonstration of a new type trolley bus will be made at the Schenectady works of the General Electric Company the latter part of May.

A thirty-passenger type car, similar in external appearance to the front-entrance trolley car except that it has rubber-tired wheels, will be equipped with trolley pole, controller, motors and other necessary apparatus for the public demonstration. Suitable trolley wires have been strung, forming a loop for demonstration runs.

General Electric engineers estimate the cost of installing a single-track trolley line on an unpaved street as about $35,000. On a paved street, where the trolley company is forced to pay for the pavement between its rails and 2 ft. outside, the cost jumps to $75,000 per mile. The overhead for a single trackless trolley costs from $5,000 to $7,000 per mile, and where a double set of wires is strung the cost will average from $7,000 to $9,000 per mile. Comparing the operating cost with the motor bus, gas and oil costs on an average of 5 cents per mile, whereas with the trackless trolley the cost of electricity is but 2 cents a mile. The maintenance of equipment, including tires, averages 9½ cents per mile for the motor bus as compared with 4 cents for the trackless trolley. For depreciation, figuring the life of the motor bus at five years, as computed from statistics supplied by nine leading auto bus manufacturers, the cost per mile is 3.4 cents, compared with 1.9 cents for the trackless trolley, based on a life of ten years.

Totaling the above figures, the saving in favor of the trackless trolley is 10 cents per bus-mile. Figuring that the average bus runs 35,000 miles per year this means a saving of $3,500. From this amount there should be a slight deduction because of the lower initial cost of the motor bus, interest on money invested, etc., which, according to railway engineers, brings the saving in favor of the trackless trolley over its gas-driven competitor to $2,700 per car per year.

With a sliding trolley pole the trackless trolley has a leeway of 18 ft., 9 ft. either side of the trolley wires. This gives it ample facilities to pass other vehicles on the street. Directly over the head of the driver is a lever by which the trolley pole can be pulled down from the wires without the operator leaving his seat.

After test and demonstration in Schenectady the car will be sent to Richmond, Va., for trial.

Features of the New Paris Franchise

Earlier Agreements, Similar to American Service-at-Cost Franchises, Failed to Stand War Strain—New Deal Involves Consolidation of Properties, 4.9 per Cent Net Return to Investor Guaranteed by the State and Rewards to Management and Men Based on Increasing Traffic and Achieving Economies

THE city of Paris and the Department of the Seine (in which Paris is located) have approved a consolidation and refinancing of the local street railway and motor bus facilities of the most far-reaching nature. At last accounts, the new plan required only the formal consent of the stockholders of the absorbed companies before going into effect. The terms of the new arrangement will best be understood if a brief account is given of the conditions leading up to this franchise.

THE AGREEMENT OF 1910

The General Omnibus Company, organized late in 1854, was a consolidation of several small horse-omnibus companies, and soon after it was founded received a franchise for buses and also for street railways. Under this franchise, which was for fifty-five years, the company not only built a great many street railway lines and extended its bus system but had a practical monopoly of all surface transport within the walls of Paris itself, and it was the only system (except the later underground railways) with which the Municipality of Paris had actual contractual relations.[*] The exceptions to this monopoly were certain bus lines which the steam railroads were permitted to operate to carry passengers to and from their railroad stations and several street railways which were permitted to enter Paris upon payment to the General Omnibus Company of certain royalties. In consequence of this latter development there were in 1910, when this franchise expired, thirteen street railway companies in Paris and vicinity, and these companies were operating with every conceivable form of propulsion—horses, trolley, conduit, storage battery, compressed air, steam, etc.

In 1910 the Municipality of Paris concluded an agreement with the General Omnibus Company which contained a number of features of general interest, aside from the provisions for motorization of the buses and electrification of the street railways, partly to trolley and partly to the conduit system, the latter being compulsory within certain areas. Among these features were the following:[†]

Change from Unit to Two-Fare System within City.—Although there had been no startling rise in costs by 1910, the General Omnibus Company seems to have realized that a continuation of the unit fare with free transfer was uneconomic on a system with an ever-growing increase in average length of ride. The unit fares of 15 centimes (3 cents) second class and 30 centimes (6 cents) first class (the latter including transfer privilege) were replaced by a zone system in which the base fare was 10 centimes (2 cents) second class and 15 centimes (3 cents) first class.

Capitalization.—The capital of the General Omnibus Company was increased from 17,000,000 francs to 80,000,000 francs to take care of the reconstruction and electrification expenses. The company was required to set aside annually a sum amounting to not less than 5 per cent of its net profits to retire each year a portion of its stock, though the holders of the stock thus retired received "participation" certificates, entitling them to share in the profits after an initial dividend of 5 per cent had been paid on the unamortized stock and also to participate in any surplus after all stock had been retired at par when the company should be liquidated.

Return to the City.—In the agreement prior to 1910, the return to the city appears to have been confined to the usual paving upkeep tax and a tax based upon the number of cars. The agreement of 1910 retained the paving charge, but replaced the car tax by a charge on gross earnings. It was agreed that the bus system should pay the city 3½ per cent of gross earnings, with a maximum of 4 per cent if the receipts exceeded a certain set figure. On the other hand, the street railway system was to pay 3½ per cent minimum, if the return to stockholders was not more than 5 per cent, up to 6 per cent maximum according to the increase in return received by the stockholders. The city could call for a reduction in fare if the earnings per car-mile or bus-mile exceeded 32 cents and 33 cents respectively. This figure was based on the size of car then in use, but was to be changed according to a specified formula if cars of different capacity were put in service. The bus contract stated that the company would not be obliged to install certain additional routes until the average earnings per bus-mile attained a stated figure. So, too, the company was entitled to apply for higher fares if the average earnings fell below 33 cents per bus-mile, provided it operated a stated minimum mileage per annum. If all such payments to the city plus the local fuel tax (octroi) exceeded 6 per cent of gross earnings, the General Omnibus Company could apply for a reduction.

Full Regulation Retained.—The Municipality of Paris retained all rights to regulate routes, timetables and fares and to exert other police powers, such as approval of rolling stock and other equipment affecting the public safety and convenience. The company's accounts were to be audited by the city, city inspectors were to be carried free and the company was to pay all regulatory expenses up to a stated maximum per mile of route. Fines and forfeiture clauses to put teeth in the regulatory ordinances were also provided.

WHY THE 1910 AGREEMENT BROKE DOWN

The three or four years following the 1910 agreement, including the change to zone fares, saw heavy increases in traffic despite the large amount of reconstruction going on and the growing competition within old Paris of the underground railways. The public, however, felt that the company was not expanding its facilities and improving its service as had been anticipated. In all likelihood, the extensive rebuilding program of the company did not tempt it to develop experimental services which would lower the average return per vehicle-mile to uneconomic levels.

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[*] For further particulars of this franchise see STREET RAILWAY JOURNAL, January, 1897, page 16; May, 1899, page 275, and Jan. 4, 1902, page 18.

[†] For further particulars of this franchise see ELECTRIC RAILWAY JOURNAL, Oct. 1, 1910, page 505.

With the arrival of the war in August, 1914, all progress naturally had to cease. In fact, it was necessary to make tremendous cuts in service because of man-shortage and other difficulties incident to the war. By 1916, also, the increase in wages, fuel and materials had become so great that the company applied for relief. It was not until 1918, however, that the first increases in fare were granted upon recommendation of a commission which had been appointed by the Prefect of the Department of the Seine to study both the matter of immediate relief and a permanent settlement.

Terms of Recapture and Consolidation Under Government Auspices

At this time there were six surface systems in the Paris metropolitan area as follows: The General Omnibus Company, Tramways-Nord, Tramways-Sud, Est-Parisien, Chemin-de-fer-Nogentais and Rive-Gauche, with a total of 943 km. or 584 miles of route. The capital investment of these companies totaled 420,900,000 francs, or approximately $81,000,000 at prewar exchange. The General Omnibus Company alone constituted practically one-half of this total. Both the city and the department were agreed that unified operation of all these lines was the indispensable basis of any post-war arrangement. To purchase these lines outright and operate them jointly offered a host of administrative entanglements.

Aside from this it did not seem feasible to the dominant political parties to go to direct community operation if it were possible to devise a plan whereby the business management of the lines would be retained without injury to the life and business growth of the community.

A plan was finally worked out and proposed which was built on the basis of private management. Following this plan, a contract was first made by the department with the city to reimburse the latter for payments in taxes, etc., which it would have continued to receive under the old franchise. Also by agreement with the city, the department purchased from the General Omnibus Company as of Jan. 1, 1921, all franchises and such properties and equipment as were of direct use in operating the lines. A special clause in the agreement reserved for the city council all powers necessary for the fixing and modification of schedules, fares and routes. Certain supplies, cash on hand and in bank remained the property of the company, but the supplies, under the terms of agreement, could be purchased at cost of manufacture. The terms of sale were to be fixed by a group of experts, three named by the Minister of Public Works, three by the company recaptured and three by the unanimous consent of the first six. In case of failure to choose the last three, the judges of the Court of Appeals were to be asked to name the additional experts. The payment was to be made in sixty semi-annual installments and, in accordance with rules applying to properties operated fifteen years or more, was to be based upon the net average earnings of the best five years out of the last seven years preceding the sale, but in no case was this amount to be less than the net receipts of the last of the seven years of the test period.

The capitalization of the companies included was:

	Capitalization, Francs
General Omnibus Company	200,000,000
Tramways-Nord	81,300,000
Tramways-Sud	65,200,000
Est-Parisien	41,400,000
Nogentais	21,000,000
Rive-Gauche	12,000,000

The Lease and the Leasing Company

While the actual contract with the leasing and operating company is made by the Department of the Seine, the city and the department have an agreement for the purpose of retaining for the city such rights as "long possession confer and vital rights demand." By this agreement a certain exchange of jurisdiction is also accomplished so that the city obtains additional jurisdiction over departmentally licensed railways within the city limits and the department over parts of municipally franchised lines which extend beyond the limits.

Most important of the provisions which form Article 3 of the covenant between the two are: The department shall endeavor to make such modifications of tramway lines within the city limits as the city council may demand by special resolution, after consultation with the commission which will supervise the working clauses of the lease; a similar provision regarding autobus routes; an agreement to submit all such changes proposed by the department to the city council; and the city fares cannot be raised or lowered without a special joint resolution of the municipal council of Paris and the council of the department.

The city is also to be the judge as to standards of line, track and paving upkeep, and is to receive certain costs plus a 10 per cent or 15 per cent payment from the company for work done in connection with these matters. Snow removal costs are to be shared equally.

The operation of the superseded companies has been taken over through contract with the Department of the Seine by a new company formed under the direction of Andre Mariage, director-generator of the General Omnibus Company, subject to various conditions as set forth July 12, 1920, by the Prefect of the Seine in a statement to the municipal and departmental councils, and abstracted herewith:

The leasing company is to have a capital of 60,000,000 francs, of which 6,000,000 francs is to be a guarantee fund, provision being made for increasing this fund as the mileage of the railway and bus routes is enlarged. This 6,000,000 francs must be invested in city of Paris bonds or other similarly stable securities approved by the department. The stockholders of the former companies have the first right to subscribe to the new company's stock on an equitable pro rata basis.

The company is to be guaranteed a gross return of 6 per cent on its investment, but the actual return, after income tax deductions and the like, is 4.9 per cent, which is less than the current rate of return on French government bonds.

The department expects that deficits will prevail for some years to come, but it does not wish the company's management to do anything that will limit the usefulness of the system to the public. It has therefore provided two forms of incentive for the operators.

A Reward for Increased Business.—In addition to the guarantee the company is to receive a bonus for increasing the gross receipts. This bonus is 0.75 per cent of the annual gross receipts up to 250,000,000 francs and 1 per cent of the gross receipts in excess of this amount. From this fund must be paid the salaries of the executive officers and of the directing board and inspectors of accounts. Good management is defined as consisting, in effect, of serving the largest population possible; and it is added that any economies realized must not result in a reduction in the number of passengers. (The actual French for the last eight words reads "de la compression des voyageurs!" The rank and file employees will receive a premium equivalent to 4 per cent of the gross receipts from traffic and advertising.

A Reward for Operating Economies.—The company will also be entitled to reward for any operating economies that do not lower the standard of service. This reward may be expressed by the formula: $0.04 \times (R - 0.65\,E)$ in which "R" represents the gross receipts and "E" respresents "operating" expenses as defined hereinafter. Out of this fund, 300,000 francs a year must be placed in a special reserve fund until the latter attains 3,000,000 francs and it must be kept at that amount. The purpose of this reserve is to have funds to make payments to the guarantee fund as the lines grow and to pay any penalties which may be levied against the company.

If the earnings, after subtraction of the awards, permit an 8 to 10 per cent dividend on stock or addition to surplus the extra above 6 per cent is to be divided between the department and the company. If there is enough to pay 10 per cent or more, the department will get three-fourths of the remainder.

ACCOUNTING METHODS

The accounts are divided under three heads as follows:

Financial, operating and remuneration. "Financial" covers all charges relating to the recapture annuities, certain minor war annuities, interest on reconstruction loans advanced by the department, etc. "Operating" not only includes the usual items connected with running a transportation system, but also include the cost of governmental regulation, of certification of accounts, of amortization of new investment in thirty years, of interest on guarantee and reserve funds, insurance, maintenance, renewals, and generally of all items not included under "financial" except the 6 per cent guarantee on investment and the efficiency awards which come under the head of "remuneration."

The company in taking over the properties guarantees to leave all employees undisturbed in their wages, seniority, privileges, etc., reserving merely the right to make changes in the case of employees receiving more than 25,000 francs per annum. It also agrees to continue the system of Workers' and Discipline Councils which were a characteristic of the General Omnibus Company's relations with its men. All employees must be French and must be chosen, so far as possible, from those who have lived at least three years in the Department of the Seine or in the contiguous departments; in the case of the latter the proportion of employees engaged should be in proportion to the mileage in their native department.

While the lease is for thirty years, the Department of the Seine reserves the right to annul the contract any sixth year upon two years' notice. In this event, the company will be reimbursed by the department for any capital not amortized and will receive the following amounts which are intended mainly to indemnify the executive officials; possibly to liquidate long-term contracts with these officials:

2,000,000 francs if annulment occurs Jan. 1, 1927.
1,750,000 francs if annulment occurs Jan. 1, 1933.
1,500,000 francs if annulment occurs Jan. 1, 1939.
1,000,000 francs if annulment occurs Jan. 1, 1945.

The Prefect of the Seine will form a consulting board made up of an equal number of representatives from the city and departmental councils plus representatives from the company, various government departments, commercial and labor bodies, etc., but these outside members must not outnumber those from the two councils. The chairman, also named by the Prefect, will cast the deciding vote in case of equal division. The functions of this board are purely advisory and cover only such topics as the Prefect assigns to it for consideration. This commission will study the allocation of the 4 per cent gross receipts bonus previously mentioned.

A more important commission is the control board made up only of representatives from the two councils and the administrative staff of the Prefect. This board will be the actual regulatory body so far as operation, audit and changes in executive personnel are concerned.

Trackless Trolleys in Germany

A RECENT inquiry in regard to trackless trolleys in Germany shows that before the war there were only three such lines in that country, one in Saxony, one in South Germany and one in Westphalia. Of these three lines only the first mentioned is now in operation, while the two others stopped work during the war. These three lines had only a total of 12 miles. The line now in operation is used as an auxiliary extension to the electric railway system of the town of Wurzen in Saxony. The two other lines served as communications between small towns.

As to financial results, the cost of installation was found to be only one-fourth to one-third of an ordinary line with tracks, but the maintenance of rolling stock cost 25 per cent more. The running expenses were found to be somewhat lower than in the case of motor-bus lines. A prime condition of the trackless trolley is a well-paved road surface and no attempt has yet been made to use this form of traction with unpaved roads. The cost of installation of the overhead wire before the war was 16,000 marks per mile, and is now from 100,000 to 160,000 marks a mile.

The line in Saxony is using cars of 3 tons in weight, with space for from twenty to twenty-four passengers, ten to fourteen of whom can be seated. The cars have solid rubber tires. In times of ordinary traffic they are run with one man. The cars are using a short-circuit brake, trolley poles of the most simple design and motors of 15 to 25 hp. with worm drive. The cost per car before the war used to be 40,000 marks and is now 100,000 to 125,000 marks. The present wages paid to the attendants on the Wurzen line are 5 to 7 marks per hour. The fare, which before the war was only 5 to 10 pfennigs, has, in the case of the one line in operation, risen to 30 pfennigs. Only in one case are data given as to total cost of running operations and revenue per kilometer. The first was 21½ pfennigs, and the second 24½ pfennigs in 1912. The German Street Railway Association, which collected these data, declares that trackless trolley lines have found little favor in Germany and there is no likelihood of their development in the future.

No Reason to Change Standard Birney Safety Car Design

An Analysis of the Situation Is Convincing Proof that the Present Standard Should Be Retained Until Some Definite and Reasonable Arguments Are Forthcoming

BY W. H. HEULINGS, JR.
Vice-President and General Sales Manager the J. G. Brill Company

THE article by J. C. Thirlwall, General Electric Company, which appeared in the April 16 issue of the ELECTRIC RAILWAY JOURNAL under the caption "Why Alter the Standard Safety Car Design?" was an excellent presentation of sound and sensible facts which deserve the thoughtful attention of all officials of street railways having safety cars in service or in contemplation.

The advantages of standardization to railway companies are so great that every precaution should be taken that no change in safety car design should be requested which will destroy the manifold advantages of the present standard design by increasing the weight of the car, the cost of operation and the cost of production and by lengthening the time of delivery.

WILL BUILD SPECIAL SAFETY CARS

The J. G. Brill Company built the eight special double-door safety cars for Madison and the four double-door cars for Lancaster, these being the only cars out of 2,839 safety cars our plants have built which have double doors. The remaining 2,827 cars have the standard single door and are responsible for the remarkable savings and earnings which have been attributed to safety cars generally. We do not recommend anything but the standard Birney safety car as designed, but where demanded we will make changes at a higher cost and longer delivery, but we certainly advise against such deviations from standard.

SMALLER CARS AND MORE OF THEM

From reports received from Madison it is evident that both the public and the railway company are satisfied with the double-door arrangement on the cars which we built for them. It would be foolhardy to deny that the simultaneous ingress and egress of passengers is quicker than with the single door, but what does this amount to? If the time saved is sufficient to warrant the additional expense and the loss in power saving which results from the increased weight, then the double-door car possesses an economic advantage. This is, in my judgment, very uncertain; in fact, I should almost say, "It certainly is not." Our experience with the safety car indicates that railways making their installations on ratios which mean more frequent service to the public have had the best results, and there is no overcrowding as there is sufficient space for the standing passengers on each car.

PUBLIC MUST BE CONSIDERED

In installing safety cars on a car-for-car basis advantage is taken by the operating company of the saving in platform wages and power consumption, but the public loses car space. They may get the same number of seats, but if the same number of standing passengers are jammed into a smaller space naturally they'll be dissatisfied and no one can blame them for kicking loud and long.

It is true that Madison tried out five standard Birney safety cars but, as stated in the March 12 issue of the ELECTRIC RAILWAY JOURNAL, the installation was made on a car-for-car displacement basis. This should certainly be taken into consideration when analyzing the safety car experience in that city.

SAFETY CAR MUST BE SMALL

To increase the length and other dimensions of the standard safety car is simply to defeat its object. In order that operating companies may reduce headways to compete with other forms of transportation by running more cars it must be possible to do this at less total cost than previous service, and this is only possible with the use of smaller light-weight units.

Mr. Thirlwall referred to another installation where the manager of the road changed some of his cars to a double-door platform type. This company had already improved its service by reducing its headways and it was only the desire on the part of the manager to speed up loading and unloading by the simultaneous ingress and egress of passengers that prompted him to convert these cars to a double-door arrangement. He soon found that the advantage in loading and unloading time gained was offset by other difficulties which are attendant to double-door operation on one-man cars and then rechanged his cars to the smaller standard single-door platform.

It is therefore evident that there has really been no convincing argument advanced that a change of the standard design of the Birney safety car to a double-door platform arrangement would satisfactorily meet general operating conditions and at the same time retain for the railway companies the maximum economies in initial cost and in cost of operation.

The city of Terre Haute, Ind., has certainly made a success of safety car operation, and since the safety cars have been in service this city has been visited by railway managers not only from cities in this country but also from foreign countries, and the fact must not be lost sight of that, during the course of an address at the convention of the American Electric Railway Association in Atlantic City last year, E. M. Walker, general manager of the railway lines, stated, "We attribute our success with safety cars principally to the fact that we have stuck religiously to the standard car."

Changes Proposed in British Classification

A COMMITTEE of British accountants of tramway undertakings has been considering revisions in the standard form of tramway accounts. The present form was drafted in 1904 by a joint committee of the Institute of Municipal Treasurers and Accountants and the Municipal Tramway Association, and since has been adopted by practically all municipal tramway undertakings and some of the companies operating tramways. Time has shown that different interpretations have been placed upon the directions given in the standard form. In consequence, the municipal tramway managers at Leeds, Sheffield and Manchester and the London group of company-owned tramways arranged for a conference of the accountants of those organizations. The accountants met in December of last year and have now recommended some alterations and additions to the standard form, without, however, fundamentally changing it.

Lists of accounts were also recommended for motor bus operation and trackless trolley operation.

The Engineer and Eminent Domain*

Legal and Engineering Problems in Condemnation Procedure Analyzed and Various Pitfalls Pointed Out—Determination of Advisability of Condemnation Sometimes Difficult—Complete History Is Given of One Condemnation Case, with All Documents

By CHARLES R. HARTE
Construction Engineer the Connecticut Company, New Haven, Conn.

EMINENT domain is the right or power of a sovereign state to appropriate property to particular uses for the purpose of promoting the general welfare. Whether, as was said by the Supreme Court of Connecticut, it "is a reserved right attached to every man's land, and paramount to his right of ownership," or whether, as is more generally held, it is a power which the state may exercise for the welfare of the community, is of much less consequence to the engineer than the fact that there is a power by which property needed to promote the general welfare of the public may be taken from the owner when for any reason he is unwilling to dispose of it at a fair price. Unlike the police power, however, which regulates the use and enjoyment of a man's own property by himself so that he shall not interfere with the general welfare of his community and compels him to submit, without compensation, to any inconvenience or loss he suffers in consequence of that regulation—the Volstead act being a shining example—eminent domain is a forcible exchange, and the taking can be effected only when just compensation is made to the owner.

THE LEGAL SITUATION

The power is a legislative one and may be delegated by the Legislature, to any one properly authorized, to promote the general welfare of the public. Unfortunately, however, the courts have been by no means agreed as to just what is such a proceeding, and while the Legislature delegates the right and must therefore decide upon what it considers a public use, the correctness of this opinion is subject to the decision of the courts, and as one perplexed judge said, "No question has ever been submitted to the courts upon which there is a greater variety and conflict of reasoning than that presented as to the meaning of the words 'public use' as found in the different state constitutions regulating the right of eminent domain." A striking example of this difference of opinion is seen in Connecticut and Rhode Island decisions. In the first state a transmission line between the power and substations of an electric railway is a public use, and, provided of course the company is authorized to exercise the right of condemnation, the necessary right-of-way may be taken by eminent domain. In the sister state just east, however, "that which pertains simply to means of supply is the private business of the company," and the Rhode Island Suburban Railway was consequently unable to exercise the power that way. And because the power is an unsuual and a "harsh" one, the courts quite generally have been very critical both to be sure that the company or person actually had been delegated the power and that its exercise was in strict accordance with the rights it had.

From the legal standpoint, then, in case condemnation is under consideration, it is essential to know, first, whether the company actually has received the right from the Legislature; second, whether the proposed use of the property desired is one which the courts of the state in which it is, have accepted as "public," or, at least, is not one they have classed as a "private" use, and, finally, that the proceeding itself is in strict accordance with the requirements of the state. It is therefore highly important that the legal advisers be not only good lawyers but that they be also familiar with condemnation proceedings as administered in the state involved.

IS CONDEMNATION WISE?

Before condemnation proceedings are started, it is well for a company to consider what is involved and what is to be gained.

In delivering the opinion of the United States Supreme Court in the Minnesota rate cases, Justice Hughes said of the railroad: "It is equipped with the governmental power of eminent domain. In view of its public purpose it has been granted this privilege in order to prevent advantage being taken of its necessities. It would be free to stand upon its legal rights, and it cannot be supposed that they would be disregarded."

Unfortunately, while this is perfectly true from the legal point of view, it disregards a practical fact that is often of the greatest importance. Under favorable conditions the proceedings may be short and sweet, and in a few states after a preliminary hearing the company, upon depositing an approved bond with the court, may proceed with the work while the lawyers fight out the questions of the final settlement. In the large majority of the states, however, it is possible for the owner to prevent possession for a very considerable time. If the proceedings have been started well in advance of the date on which the property is necessary, this may cause but little trouble; more usually these cases arise at the last minute. Of course, if the owner refuses to sell on any terms, and the project is not to be abandoned, there must be condemnation or relocation. Such cases, however, are comparatively rare. The trouble usually arises over the amount. It then becomes an interesting question what to do; namely, (1) condemn, and have the expenses of the proceeding and the interest on the investment kept idle until possession is obtained, and in many cases the increased cost of the work which has to be done in an adverse time because of the delay to be added to the award for the land, or (2) pay out of hand the price asked and save the costs and annoyances of the holdup, but establish a precedent which may make trouble later on, and is unfair to those who sold at a reasonable price.

At the time of the Minnesota rate cases, although every one who had had experience in buying right-of-way knew that its cost averaged materially higher per acre or square foot than similar adjacent land, there were available no definite proofs of the claim made by Mr. Cooper of the Northern Pacific, that while city land cost but little more per unit when bought for right-of-way than for other purposes, farm lands averaged in cost three times as much for the one purpose than for the other. The court refused to accept his belief, but recent investigations in connection with the federal valuation of the railroads, however, indicate that Mr. Cooper was quite right. In view of the facts that the ratios for the several classes of land do not materially vary in different parts of the country, it may fairly be considered that the costs of condemnation and the consequent delays, but not including the normal price of the land condemned, in the case of farm lands are at least double the normal price of all the farm lands of the right-of-way; that in the case of suburban land the extra cost is equal to the normal price, while in city land the excess is about one-fourth, normal price referring to the price which would be paid for similar land in ordinary parcels and sales.

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*See "The Engineer and the Right-of-Way," by Mr. Harte, ELECTRIC RAILWAY JOURNAL, June 26, 1920, page 1301.

The moral of this is that condemnation is expensive, and the possibility of adjustment in a different way should be carefully considered before it is employed.

THE ENGINEERING SITUATION

If it has been decided that condemnation must be resorted to, the engineering features demand consideration. While there are wide differences of opinion as to many legal features, the authorities are quite generally agreed that the actual taking must very closely follow the petition.

If the taking describes a strip of sufficient width for all structures there will be little difficulty provided it is not held unnecessarily large—some of the states are very strict in this respect—but particularly in the case of a transmission line; locations for the individual poles, guys and other elements can usually be obtained with far less trouble and expense, and if the description is properly made and includes right of access, such a taking serves as well as a strip unless changes are necessary at a later date.

Just what should be included in the description depends upon the attitude of the courts. In some states it has been held that the right of the company to exercise the power of eminent domain should be most carefully considered, but once its right to employ it is established the intent of the Legislature rather than a literal interpretation should be considered. In others a most exact compliance with all the forms has been insisted on. As it is desirable to have the taking as elastic as may be safe, this is a matter which calls for close co-operation between engineer and counsel, and the former should not forget that the owner's title extends above and below the surface of the ground, and that the wires between the poles, the overhang of the cross arms, and the underground portions of anchors and braces occupy the property no less than the poles themselves, and, further, that the right of location does not of necessity carry with it the right of entry at a later date for the purpose of maintenance and replacement. Still further, it should be remembered that a long pole cannot be taken around a sharp bend in a narrow right-of-way without overhanging adjacent land and that a right of access to the line for the purpose of maintenance may be held to apply only to the land of the grantor, and not to give the right to team or go over it to reach a part of the line on other land unless it is so stated. Finally, not only should there be set out the right to trim to a definite distance from the center line all existing trees, but it should also be borne in mind that old trees grow and new ones are planted from time to time, and the right should definitely provide for proper future trimming. In New York "the right to trim such trees as may be necessary to protect said line from interference" was held too indefinite a statement to permit the determination of the damage to be compensated for.

It should not be supposed that every case of condemnation involves such complications, however. Probably in nine cases out of ten, even with a very faulty taking, no questions will be raised, but in case of trouble the matter may prove very serious, as there have been decisions holding that one condemnation exhausted the power, and it is the part of wisdom to be sure rather than sorry.

THE ACTUAL TAKING

The details of the actual taking differ materially in different states, but there are certain general features common to nearly all. It is generally necessary to state that the parties cannot agree upon a price, and there must be a vote by the proper parties that the property in question, so described as to definitely fix it, be taken. Thereafter come such hearings, viewings, determination of damage, awards, appeals, and final decisions as may be required by the state in which the land or property is located.

It may be of interest to see just what steps were followed in a case in Connecticut, where, however, the award was not appealed.

PROCEDURE FOLLOWED IN CONNECTICUT

In 1917 the Connecticut Company found it desirable to build a transmission line between New Haven Station "A" and North Haven, and having made a location, on July 21, 1917, filed with the Public Utilities Commission a petition (Exhibit I) for the approval of the location and the method of construction, whereupon the commission appointed (Exhibit II) a date for a hearing when all parties might be heard, and, following the hearing, made a finding of approval (Exhibit III).

Most of the desired location was secured with little trouble, but one John S. Palmer, while not hostile to the company—in fact, the action was rather a friendly one—asked a price which seemed all out of reason. Accordingly on Nov. 3 the directors of the Connecticut Company voted (Exhibit IV) to locate upon and take the necessary land. The petition to the commission for the taking asked a reapproval of the plans, since the first plan did not show the necessary detail for condemnation. This petition and the notice of a hearing on it were repeated in the finding of necessity (Exhibit V). Then followed a petition (Exhibit VI) to the Superior Court to appoint appraisers; the court order (Exhibit VII) for a hearing on the taking; the hearing, at which appraisers were presented to the court and accepted (taker and owner each select one and these two choose a third); the formal court approval (Exhibit VIII); the trips of the appraisers to the spot to view the land and determine the damage; and, finally, the return (Exhibit IX) of the appraisers to the court, which has the effect of a court judgment. It will be seen that from the vote of the directors on Nov. 3 to the judgment was a trifle over sixty days. This was a friendly suit, speeded by all, with no appeal. In the Stevens case, also in Connecticut, the matter was dragged out for five years.

Documentary Exhibits in the Palmer Condemnation Case

Exhibit I—Petition for Approval

TO THE HONORABLE PUBLIC UTILITIES COMMISSION OF THE STATE OF CONNECTICUT.

The petition of the Connecticut company respectfully represents:

1. That it is a company organized and existing under and by virtue of a charter granted by the General Assembly of the State of Connecticut, for the purpose of constructing and operating street railways, and having its principal office at New Haven in said State.

2. That it has the right to construct a transmission line consisting of two circuits, each of three stranded 2/0 copper cables on porcelain insulators with metal pins bolted to 3½ x 4½ yellow pine cross arms having angle iron braces, all on "Class B" chestnut poles, details being shown on the attached sketches, said line to run from Station A of said Connecticut Company in New Haven on the poles carrying the present Branford transmission line as far as Middletown Avenue, New Haven, and thence on private way and along and across highways as shown on the accompanying plan to the North Haven substation of said Connecticut Company.

3. That it has caused to be made a plan showing the highways in and through and over which it proposes to build said transmission line and also detail plans showing the construction at highway, railroad and wire line crossings, which first named plan is entitled, "The Connecticut Company—New Haven Lines—Office of Construction Engineer, New Haven, Conn.—Proposed transmission line—Station A, New Haven to North Haven substation—Scale 1: 20,000 Date July 21, 1917," and which detail plans, of which four show pole top construction and twelve show crossings set forth in their respective titles, the location of each kind of construction and of each crossing.

WHEREFORE, it prays your Honorable Body, after public notice and hearing thereon, to accept and adopt said plan, and make all necessary orders to render available the location of said transmission line and its structures as approved by your Honorable Board.

Dated at New Haven, Conn., this twenty-first day of July, 1917.

THE CONNECTICUT COMPANY,
by Charles Rufus Harte,
Construction Engineer.

Exhibit II—Notice of Hearing by Public Utilities Commission

PUBLIC UTILITIES COMMISSION STATE OF CONNECTICUT DOCKET NO. 2,437.

In the matter of petition of the Connecticut Company for approval of proposed method and manner of construction of a transmission line from station "A" of said petitioner in the city of New Haven to Middletown Avenue in said city, and thence on private way and along and across highways in the town of North Haven.

On July 23, 1917, the following petition was presented:

STATE OF CONNECTICUT, OFFICE OF THE PUBLIC UTILITIES COMMISSION.

Upon the foregoing it is ordered that same be heard at the office of the commission in Hartford, Room No. 47, State Capitol, on Monday, July 30, 1917, at 11:30 o'clock in the forenoon and that notice of the time and place of said hearing be given to the petitioner, to the city of New Haven, to the town of North Haven and to the various pole line companies whose wires it is proposed to cross, by Henry F. Billings, secretary of this Commission, by forwarding by registered mail, true and attested copies of said petition and of this order of notice for hearing, addressed one to Victor S. Curtis, secretary the Connecticut Company, New Haven, Conn., one to the Mayor and Board of Aldermen of the city of New Haven, Conn., one to the Board of Selectmen of the town of North Haven, North Haven Conn., one to the Southern New England Telephone Company, New Haven, Conn., one to the United Illuminating Company, New Haven, Conn., one to George M. Yorke, vice-president Western Union Telegraph Company, No. 195 Broadway, New York, N. Y., one to S. L. Hays, general foreman Western Union Telegraph Company, New Haven, Conn., one to Postal Telegraph-Cable Company, Connecticut Mutual Building, Hartford, Conn., and one to Arthur E. Clark, secretary the New York, New Haven & Hartford Railroad, New Haven, Conn., on or before the twenty-fourth day of July, 1917, and due return make hereon.

Dated at Hartford, Conn., this twenty-third day of July, A. D., 1917.

PUBLIC UTILITIES COMMISSION,
By *Henry F. Billings*,
Secretary.

Hartford County, ss.

Hartford, July 24, 1917.

Then I deposited in the post office in Hartford, by registered mail, true and attested copies of the foregoing, addressed to the parties as directed in said order.

Attest:

Henry F. Billings,
Secretary.

Exhibit III—Finding of Commission on Petition for Approval

PUBLIC UTILITIES COMMISSION STATE OF CONNECTICUT, DOCKET NO. 2437.

In the matter of petition of the Connecticut Company for approval of proposed method and manner of construction of a transmission line from station A of said petitioner in the City of New Haven to Middletown Avenue in said city, and thence on private way and along and across highways in the town of North Haven.

On July 23, 1917, the following petition was presented.

(Here followed the petition in full.)

The foregoing petition was duly assigned for hearing at the office of the Commission on Monday, July 30, 1917, at 11:30 o'clock in the forenoon, at which time and place the parties appeared and were fully and finally heard. Several of the companies whose lines will be crossed by the proposed construction appeared at said hearing but offered no objection to the granting of said petition. Petitioners stated the general purposes of the proposed construction and the specifications under which it would be carried out. Blue print plans referred to in the petition were explained at said hearing. It was stated that in general the method of construction would follow the specifications approved by the United States Bureau of Standards as set forth in the National Electric Safety Code, so-called, issued November, 1916. It was stated that the normal length of span between poles would be 125 feet but that owing to topographical conditions and presence of structures of other companies, the span distance would be somewhat increased at certain points, but that in such cases the extra span length would be compensated for by additional strength of construction.

Upon consideration of all the facts shown at said hearing we are of opinion and find that approval should be and it hereby is given for the construction by the Connecticut Company of a transmission line from Station A, so-called, of said Connecticut Company in New Haven, on poles carrying the present Branford transmission line of said company, as far as Middletown Avenue, New Haven, and thence on private way and along and across certain highways to the substation of said Connecticut Company, in the town of North Haven, as shown on blue print plan on file in this office and made a part hereof, which plan is entitled: "The Connecticut Company, New Haven Lines, Office of Construction Engineer, New Haven, Conn. Proposed transmission line Station A New Haven to North Haven, Substation. Scale: 1/200,-000, July 21, 1917. Drawn by A. L. C. Traced by A. L. C. Approved Charles Rufus Harte, Construction Engineer." Said construction to be in accordance with specifications approved by the United States Bureau of Standards as set forth in the National Electric Safety Code, so-called, issued by said Bureau November 15, 1916, and as more particularly shown on blue print plans on file in this office and made a part hereof which plans, consisting of four blue print sheets showing pole top construction, one blue print sheet showing construction at angle points, and thirteen blue print sheets showing construction at crossings of highways and lines of other companies are sub-titled respectively as follows:

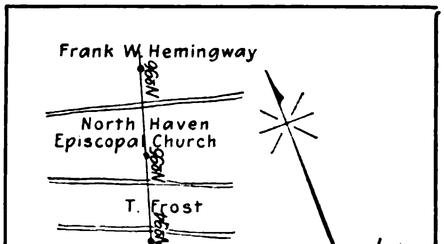
1. New Haven-North Haven transmission line; pole top construction on special crossing poles with 11,000 and 33,000 volt circuits.
2. Pole top construction on poles with 11,000 and 33,000-volt circuits, wood poles.
3. Normal pole top construction, wood poles.
4. Pole top construction on special crossing poles carrying 33,000-volt circuits.

1. New Haven-North Haven transmission line; construction at angle points.

1. Proposed transmission line, station A New Haven to North Haven substation, main highway crossing.
2. Crossing over Northford highway.
3. Old highway crossing, North Haven, Conn.
4. Crossings over main highway and Connecticut Company tracks.
5. Crossing over highway bridge near Muddy River.
6. Crossing over New York, New Haven & Hartford Railroad at Muddy River.
7. Crossing over Montowese Railroad Station.
8. Crossing over New York, New Haven & Hartford Railroad at Middletown Avenue.
9. Crossing over New York, New Haven & Hartford Railroad near Quinnipiac River.
10. Crossing over Ferry Street—Middletown Avenue.
11. Main Street and Peck and Blatchley Avenue crossings.
12. James and Humphrey Streets and Railroad crossings.
13. Grand Avenue crossing.

the normal length of span between poles to be not exceeding 125 ft. and whenever a longer span is found to be necessary the method of construction shall be such as to accord the same factor of safety as exists under the normal construction with 125 ft. span.

We hereby determine and direct that notice of the foregoing be given to the petitioner, to the city of New Haven, to the town of North Haven, and to the various pole line companies whose wires it is proposed to cross, by Henry F. Billings, secretary of this Commission, by forwarding by registered mail, true and attested copies hereof, addressed one to Victor S. Curtis, secretary, the Connecticut Company, New Haven, Conn., one to the Mayor and Board of Aldermen of the city of New Haven, New Haven, Conn., one to the Board of Selectmen of the town of North Haven, North Haven, Conn., one to the Southern New England Telephone Company, New Haven, Conn., one to the United Illuminating Company, New Haven, Conn., one to George M. Yorke, vice-president,



CONNECTICUT COMPANY'S PLAN, SHOWING LAND TO BE CONDEMNED AND TAKEN FROM JOHN S. PALMER. THIS PLAN IS PART OF EXHIBIT IV

Western Union Telegraph Company, 195 Broadway, New York City, one to S. L. Hays, general foreman, Western Union Telegraph Company, New Haven, Conn., one to Postal Telegraph-Cable Company, Connecticut Mutual Building, Hartford, Conn., and one to Arthur E. Clark, secretary, the New York, New Haven and Hartford Railroad Company, New Haven, Conn., on or before the Ninth day of August, 1917, and due return make hereon.

Dated at Hartford, Connecticut, this third day of August A. D., 1917.

RICHARD T. HIGGINS } PUBLIC UTILITIES
C. C. ELWELL } COMMISSION

Hartford County, ss.:
Hartford, Aug. 9, 1917.

I hereby certify that the foregoing is a true copy of the original order as on file and record in this office.

Attest:
By *Henry F. Billings*,
Secretary.

Exhibit IV—Vote of Directors to Condemn Land of John S. Palmer

At a regular meeting of the directors of The Connecticut Company held in the general offices of the company in the Second National Bank Building, 129 Church Street, New Haven, Conn., on Saturday, Nov. 3, 1917 at 10:45 a.m.

On motion, duly seconded, the following resolution was unanimously adopted:

"RESOLVED: That in connection with Authorization No. 2538 to build a transmission line between New Haven and North Haven, public necessity requires that the extension of the already existing transmission line be located upon and across land, the record title of which is in Harry V. Santry, of New Haven, Conn., but to which John S. Palmer. of said New Haven. claims to have an interest, said land being in the town of New Haven, county of New Haven and State of Connecticut, and bounded and described as follows:

"'Southeast by Middletown Avenue; Southwest by land formerly of Albert Goodyear, now of Mary C. Rowe; Northwest by the creek, and Northeast by land formerly of T. Foisie, now of Alice C. M. Cummings; containing four and one-half (4½) acres, more or less, being salt meadow. All as shown on attached plan, entitled: "The Connecticut Company, New Haven, lines, Office of Construction Engineer, New Haven, Conn. New Haven-North Haven Transmission Line. Location across John S. Palmer, Nov. 3, 1917."' and

"RESOLVED: That the Connecticut Company locate said transmission line upon the land above described, and take all land needed therefor."

A true copy of record,
(Signed) *V. S. Curtis*,
Secretary.

Exhibit V—Finding of Commission on Petition to Fix Limits of Taking

PUBLIC UTILITIES COMMISSION, STATE OF CONNECTICUT, DOCKET No. 2604.

In the matter of petition of the Connecticut company for reapproval of construction of a transmission line in the city of New Haven and town of North Haven, as appears on file under Dockets Nos. 2437 and 2437A, dated Aug. 3, 1917 and Sept. 13 1917, respectively.

On Nov. 15, 1917, the following petition was presented:

TO THE HONORABLE PUBLIC UTILITIES COMMISSION OF THE STATE OF CONNECTICUT.

The petition of the Connecticut Company respectfully represents:

1. That it is a company organized and existing under and by virtue of a charter granted by the General Assembly of the State of Connecticut, for the purpose of constructing and operating street railways, and having its principal office at New Haven in said State.

2. That on the eighteenth day of September, 1917, after public notice and hearing, your Honorable Commission approved plans for locating, constructing, and maintaining certain foundations, posts, poles, and wires and all appurtenances thereto necessary for the operation of the railway of the Connecticut Company by electricity, as more fully appears in Docket No. 2437 and Docket No. 2437A in the files of your Honorable Commission.

3. That the location of said foundations, posts, poles, wires and appurtenances, calls for the same to cross certain land in the city and county of New Haven, the record title of which stands in the name of one Harry V. Santry, as more definitely shown on blue print hereto attached, and entitled: "The Connecticut Company, New Haven Lines, Office of Construction Engineer, New Haven, Conn. New Haven to North Haven Transmission Line. Location across John S. Palmer. Scale 1" = 100'. Approved, Charles Rufus Harte, Construction Engineer."

4. That one John S. Palmer, residing on Quinnipiac Avenue, in the town of North Haven, Conn., also claims an interest in said land.

5. That said John S. Palmer refuses to grant permission to the Connecticut Company to erect its posts, poles, wires and other appurtenances across said land.

Wherefore, said the Connecticut Company prays your Honorable Body, after notice to said John S. Palmer, to re-approve said construction and to prescribe upon said land the limits within which real estate shall be taken for the purposes approved in Docket No. 2437A, and to give written approval to said the Connecticut Company of the location as limited by you.

Dated at New Haven, Conn., this fifteenth day of November, 1917.

THE CONNECTICUT COMPANY,
By *S. W. Baldwin*,
Its Attorney.

STATE OF CONNECTICUT, OFFICE OF THE PUBLIC UTILITIES COMMISSION.

Upon the foregoing it is ordered that same be heard at the office of the Commission in Hartford, Room No. 47, State Capitol, on Monday, Nov. 26, 1917, at 11:30 o'clock in the forenoon and that notice of the time and place of said hearing be given to the petitioner, to Harry V. Santry, in whose name stands the record of title of certain land proposed to be crossed, and to John S. Palmer, also claiming an interest in said land, by Henry F. Billings, secretary of this Commission, by forwarding by registered mail, true and attested copies of said petition and of this order of notice for hearing, addressed one to Victor S. Curtis, secretary, the Connecticut Company, New Haven, Conn., one to Harry V. Santry, 134 Grand Avenue, New Haven, Conn., and one to John S. Palmer, Quinnipiac Avenue, North Haven and City of New Haven, Conn., on or before the ninteenth day of November, 1917, and due return make hereon.

Dated at Hartford, Conn., this ninteenth day of November A. D., 1917.

PUBLIC UTILITIES COMMISSION,
By *Henry F. Billings*,
Secretary.

Hartford County, ss.
Hartford, Nov. 19, 1917.

Then I deposited in the post office in Hartford, by registered mail. true and attested copies of the foregoing, addressed to the parties as directed in said order.

Attest:
Henry F. Billings,
Secretary.

Exhibit VI—Petition to Superior Court to Appoint Appraisers

THE CONNECTICUT COMPANY
vs.
JOHN S. PALMER

Superior Court
New Haven County

In the matter of the application of the Connecticut company for the appointment of appraisers to estimate damages for the taking of real estate.

TO THE HONORABLE JAMES H. WEBB,
a Judge of the Superior Court:

The application of the Connecticut Company, a corporation organized and existing under and by virtue of a charter granted by the General Assembly of the State of Connecticut, for the purpose of constructing and operating street railways, and having its principal office at New Haven in said state, respectfully represents:

1. That your applicant on the third day of November, 1917, by a vote of its Board of Directors of that date, took for railway purposes the land described in said vote, for the construction, maintenance or operation of necessary and properly supported conductors of electricity for the transmission of electricity from New Haven upon its railway where said electricity is generated to North Haven, in said State, where said electricity is to be applied, as more fully appears in said vote which is attached hereto, marked "Exhibit 'A,'" and made a part hereof.

2. That on the twenty-seventh day of December, 1917, the Public Utilities Commission of the State of Connecticut, under its Docket No. 2604, approved the taking of said land and limited the location of said land to be taken, as more fully appears in copy of said Docket No. 2604, which is attached hereto, marked "Exhibit 'B,'" and made a part hereof.

3. The only party now claiming an interest in said land is John S. Palmer, who resides on Quinnipiac Avenue, in the Town of North Haven, County of New Haven, and State of Connecticut.

4. Your applicant is unable to obtain said land by agreement with said John S. Palmer.

Wherefore, your applicant applies to Your Honor to appoint appraisers, as provided by statute, to estimate all damages that may arise to any person from the taking and occupation of the above described real estate for railway purposes, and asks that Your Honor will further order that reasonable notice of this application be given to said John S. Palmer.

Dated at New Haven, Conn., this twenty-ninth day of December, A.D., 1917.

THE CONNECTICUT COMPANY,
By *S. W. Baldwin*,
Its Attorney.

Exhibit VII—Court Order for Hearing on Taking

THE CONNECTICUT COMPANY
vs.
JOHN S. PALMER

Superior Court
New Haven County

In the matter of the application of the Connecticut Company for the appointment of appraisers to estimate damages for the taking of real estate.

The foregoing application of the Connecticut Company praying for the appointment of appraisers to estimate all damages that may arise to John S. Palmer from the taking and occupation of real estate for railway purposes, as set forth in said application, having been presented to me, a Judge of the Superior Court, it is

ORDERED that the same be heard and determined before me at ten o'clock in the forenoon on the third day of January, A.D. 1918, at the Superior Court Room in New Haven, and that notice of the pendency of said application and of this order be given to said John S. Palmer, the party in interest, by some proper officer or indifferent person, by personally presenting to said John S. Palmer, or leaving at his place of residence, a true and attested copy of said application and of this order, and return make of his doings under this order.

Dated at New Haven, Conn., this thirty-first day of December, A.D., 1917.

(Signed) JAMES H. WEBB,
A Judge of the Superior Court.

Exhibit VIII—Court Approval of Choice of Appraisers

In the Matter of the Application
of THE CONNECTICUT COMPANY, a
corporation, of New Haven,
Connecticut.
vs.
JOHN S. PALMER,
of North Haven, Conn.

Before
HONORABLE JAMES H. WEBB,
A Judge of the Superior Court,
New Haven County,
Jan. 3, 1918.

JUDGMENT

In the matter of the application of the Connecticut Company in the above entitled cause, dated December 29, 1917, and returnable before me as a judge of the Superior Court on the third day of January, 1918, the parties, having been duly notified, appeared before me in the Superior Court Room in New Haven on said date and agreed upon.

Ernest Brockett, of North Haven, Conn.,
William A. Wright of New Haven, Conn.,
and
David B. Andrews, of North Haven, Conn., as the appraisers.

Wherefore, in accordance with the statutes in such cases made and provided, I appoint

Ernest Brockett,
William A. Wright,
and
David B. Andrews,

appraisers to estimate the damage, if any, which may arise to said John S. Palmer from the taking and occupation of the land in the manner and form as limited in Docket No. 2604 of the Public Utilities Commission of the State of Connecticut, as more fully appears in said Docket, a copy of which is to this petition attached.

HONORABLE JAMES H. WEBB,
A Judge of the Superior Court.

Exhibit IX—Appraisers' Return, Which Is Equivalent to a Judgment by the Court

In the Matter of the Application of
THE CONNECTICUT COMPANY,
a Railway Corporation, of
New Haven, Conn.
vs.
JOHN S. PALMER,
of North Haven, Conn.

Before
HONORABLE JAMES H. WEBB,
A Judge of the Superior Court,
New Haven County,
January, 1918.

RETURN OF APPRAISERS

To the Clerk of the Superior Court in and for the County of New Haven, Conn.

The undersigned, appointed Jan. 3, 1918, upon application of the Connecticut Company, by the Honorable James H. Webb, a Judge of the Superior Court, appraisers to estimate and assess all damages arising from the taking and occupation of certain lands, fully described in said application to John S. Palmer, the owner of said lands, respectfully report:

That they gave due notice to said John S. Palmer, and to the applicant, that they would meet for the purpose of their appointment on the ninteenth day of January, 1918, at the Superior Court House, in the City of New Haven, in said New Haven County, at ten o'clock in the forenoon, and on said day they met at the time and place named in their notice, and were duly sworn, and met said John S. Palmer and the applicant, who made appearance, and on said day they viewed the premises described in the application, and they fully heard said parties their witnesses and counsel, concerning the damages aforesaid.

That the lands taken and occupied by the applicant are contained in the land in the city and county of New Haven, State of Connecticut, and bounded and described as follows:

Southeast by Middletown Avenue; Southwest by land formerly of Albert Goodyear, now of Mary C. Rowe; Northwest by the Creek, and Northeast by land formerly of T. Forsie, now of Alice C. M. Cummings, containing four and one-half (4½) acres, more or less, being salt meadow, and the amount taken is limited as follows:

So much of said land as may be necessary for the erection and maintenance of a transmission line, together with the necessary supports, wires and fixtures, over, across and upon the land of said Palmer, the land necessary to be taken for this purpose not to exceed a total width of thirty feet (30 ft.), the same being fifteen feet (15 ft.) in width on either side of the center line of poles; and a right of way easement in said land twelve feet (12 ft.) in width and running in a westerly direction along the southerly boundary of said land, from said Middletown Avenue to that portion of the land hereinbefore referred to as necessary to be taken for the erection and maintenance of said transmission line, all as shown on plan attached to the petition herein and entitled: "The Connecticut Company, New Haven Lines. Office of Construction Engineer. New Haven, Conn. New Haven-North Haven Transmission Line. Location across John S. Palmer, No.. 3, 1917."

That said John S. Palmer appeared and claimed damages arising from the taking and occupation of said land as above described.

Wherefore, the said appraisers, having viewed said land and fully considered the evidence of said parties and their witnesses, and the claims and arguments of counsel, do estimate all damages arising to said John S. Palmer from the taking and occupation by the applicant, for the purposes set forth in said application, at one hundred dollars ($100).

Dated at New Haven, Conn., this (?) day of January, 1918.

ERNEST BROCKETT
WILLIAM A. WRIGHT } *Appraisers.*
DAVID B. ANDREWS

Equipment and Design Features of Metropolitan District Cars

Improvements Over Cars of Older Design Include Use of 190-Hp. Tapped-Field Motors, Semi-Automatic Acceleration and More Compact Arrangement of Auxiliary Equipment

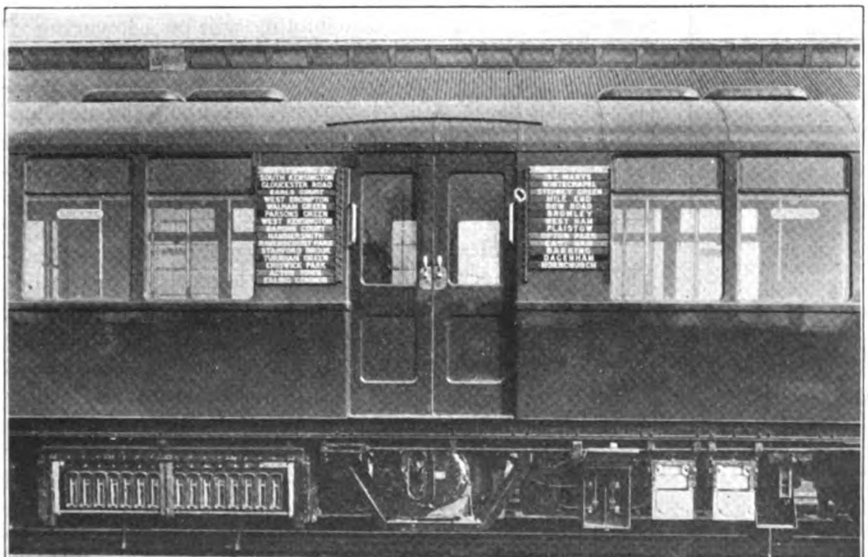
AN ARTICLE dealing with the new steel rolling stock received by the three railways operating London's rapid transit lines was printed in the March 5 issue of this paper. This dealt more particularly with their ability to permit rapid transfer of passengers as determined by the number and arrangement of doors. Also some attention was devoted to a general description, which included the layout of the seats, the replacement of straps with handrails and posts and interior fittings. Now more detailed information has been forthcoming relating to the general design and equipment features of the Metropolitan District Railway cars.

The first cars of the order, comprising 100, were put in service in February. During the first few days an eight-car train was stationed for a few hours at one of the busiest stations, with the view of letting the public familiarize itself with the improved rolling stock as a concrete example of how Lord Ashfield was overcoming congestion difficulties in the underground railways. The train aroused a great deal of public and newspaper interest and comment.

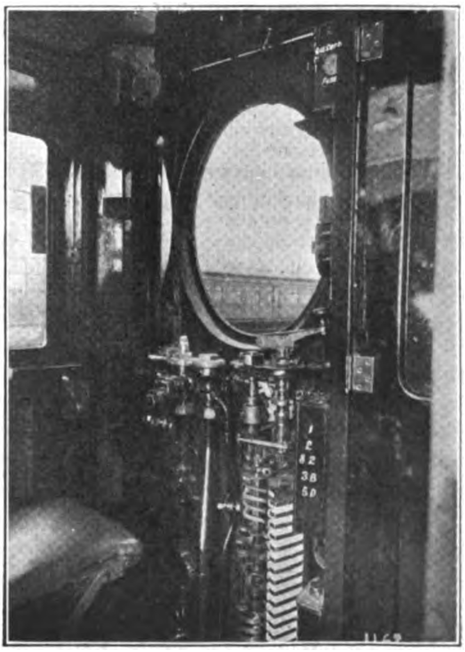
The cars are 49 ft. long and 9½ ft. wide. Their height is about 12 ft. The motor cars weigh about 50 tons each, the control trailers 29 tons and the trailer cars 27.5 tons. The wheel base of the motor trucks is 7 ft. 10 in.

Much thought has been put into the electrical design, for that equipment embodies and co-ordinates the most modern apparatus. The motor cars are each equipped with four G. E. 260 motors, which are of the interpole tapped-field self-ventilating type. They are rated at 190 hp. for one hour and 182 amperes continuously. The motors are fitted with twenty-tooth pinions geared to sixty-three-tooth gears. The wheels are 36 in. in diameter. Each pair of motors with its control gear constitutes a complete unit equipment. The normal rate of acceleration will be 1½ m.p.h.p.s.

Substantial improvements have been made in the control apparatus. The contactor tips are provided with arcing horns and a molded arc chute. The interlocks are of the disk type, mounted on the back of the contactor.



RESISTORS, COMPRESSOR, ISOLATING SWITCH, MOTOR-FUSE BOX AND CIRCUIT BREAKER ARRANGED ON UNDERSIDE OF CAR



MOTORMAN'S CAB ON LEFT-HAND SIDE OF CAR—CONTROLLER COVER OFF

The contactor box with all its contactors, resistances, etc., is a unit complete with wiring and has its own terminal base. The reverser connected to the motor fields is of the drum type operated by a pair of opposed solenoid coils. The control is non-automatic except that the motor field is weakened automatically by the tapped-field relay when the current decreases as the last parallel point on the controller is reached.

The cars are equipped with Westinghouse clasp brakes of the standard type and are provided with automatic slack adjusters. Hand brakes are fitted to all motor cars and control trailers.

The underframes are constructed entirely of steel, bulb angles form the sole bars and the center longitudinals are rolled steel channels running the whole length of the frame. The cross bearers at the trucks are pressed channel sections. The floor plates are stiffened with short angles and pressings across from the sole bars to the center longitudinals.

The motor car truck side frames are channel sections running the whole length of 13 ft. to the headstocks, but are cut away on the bottom flange to receive the axle boxes. The bolsters are built up of 8 x 3 in. channels 5½ in. apart and stiffened with 5/16-in. plates.

The former arrangement of carrying the draft gear back to the kingpin has been abandoned and a short drawbar fixed to the longitudinal members is substituted. Tight couplings between cars is the result of the use of a central spring buffer through which the drawbar head passes.

Rules for Track Foremen

Eastern Massachusetts Gives Nine Suggestions to Help Them in Their Work

F. B. WALKER, *engineer maintenance of way Eastern Massachusetts Street Railway, has got out the following nine suggestions for the track foreman on that system:*

THINGS TO DO IF YOU ARE TO MAKE A SUCCESS IN 1921 ON YOUR DIVISIONS

1. Keep all tools and equipment properly repaired.
   Blaming your tools is a POOR EXCUSE.
2. Make requisitions and properly record all material used.
   Taking material without requisition is THEFT.
3. Secure approved authority for all work not current maintenance.
   This railway has to have SOME SYSTEM.
4. Know that proper equipment and tools and efficient men are on every job.
   Lack of these shows POOR PLANNING.
5. Concentrate on more extensive and better repairs to rail joints.
   Poor joints make POOR TRACK and high maintenance COSTS.
6. Weld as many joints as possible with due regard to costs.
   Welded joints are a substantial ECONOMY.
7. Drain your track at all seasons—DIG, DITCH and DRAIN.
   Bad drainage is a CRIME. Its penalty is DEATH to track and motors.
8. Reciprocate in use of tools and cars with other divisions.
   Because you are a GENTLEMAN.
9. Team work means SUCCESS. Secure this by having all your men know, so far as is consistent, the costs, plans and reasons for doing our work.

One-Man Departments Are to Be Avoided

Chamber of Commerce Meeting

Paper on Arrested Development of Public Utilities Presented by Edward N. Hurley at One General Session at the Annual Meeting Held at Atlantic City

THE annual meeting of the United States Chamber of Commerce, held last week at Atlantic City, concluded on April 29. On the evening of April 28 Secretary Herbert Hoover of the Department of Commerce presented an address. At the final meeting President Defrees was re-elected president.

The only paper directly related to public utilities was on their arrested development and was presented by Edward N. Hurley, formerly chairman United States Shipping Board and now with the Hurley Machine Company, Chicago, Ill. An abstract follows:

Arrested Development of Public Utilities*

BY EDWARD N. HURLEY

Formerly Chairman United States Shipping Board

AMERICA today is at the crossroads of electrical development. It is a question whether we are to go forward or stand still. At this very moment the electrical industry is suffering from arrested development. The industry is awaiting the verdict of the American people. We like to think of ourselves here in America as the pioneers in the science of electricity. We have been the pioneers, but the job we started has not been half done. There are still fourteen million homes in the United States without electric service and which eventually will have it. It is authentically stated that if the present problem of housing the population is to be met, the United States needs 1,500,000 additional homes, 500,000 additional factories, 5,000 public schools, 5,000 churches, 60,000 apartment buildings and 15,000 theaters. These, too, mean electric service. There are 150,000 pending applications for power by existing or new industrial plants desirous of utilizing electricity.

PROPER ENCOURAGEMENT NEEDED

If the proper encouragement is given to the electric light and power industry, the industry will spring forward in the next decade faster even than in the past decade. The result unquestionably will be a lowering of the cost of living and the conservation of national resources which cannot fail to benefit the whole population. I think it will be agreed that upon the development and application of electrical energy, more than upon any other one thing, are dependent both the speeding up of production and the conservation of our natural resources.

The financial standing of a well managed street railway, gas or electric lighting plant is as vital to the life and development of a community as its banks, and should be protected against unfair attacks so that customers and the investing public will have confidence in the properties, resulting in a desire to purchase utility securities when offered. The American people must realize that confidence in public utility securities cannot be had by constant, unjust criticism. If the same kind of public attack should be made upon national and state banks in the same communities where members of state commissions and other public officials are now bitterly assailing the central stations and street railway companies, the public would lose confidence and in a very short period these banks would be forced to close their doors.

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*Abstract of address presented at the annual meeting of the Chamber of Commerce of the United States, Atlantic City, N. J., April 29, 1921.

FINANCING FROM EARNINGS IMPOSSIBLE

No public utility corporation subject to regulation can finance its requirements out of earnings.

For every dollar of additional annual gross revenue from the sale of electric energy by a light and power company it is necessary to provide additional facilities involving an investment of from $4 to $6. Thus a company with a gross revenue of, say, $1,000,000 per year, to provide for a growth of 10 per cent per annum ($100,000), which is a very moderate rate, would have to spend $400,000 to $600,000 for additional generating capacity and distribution facilities. With earnings limited by commission regulation to 8 per cent on the invested property value, which is below the actual cost of obtaining capital, it will be readily seen that additional capital must be secured if the facilities are to be provided to enable the growing service requirements of the community to be met, and such capital can be obtained only if assured a reasonable, permanent return.

Therefore, adequate facilities for the transportation, lighting and industrial requirements of a growing community can be made available only if the attitude of the public and of the commission authorities toward the electric enterprise is such as to encourage the necessary capital investment and to afford it the security as to principal and return without which the investor will refuse to become interested in the situation.

When financing, companies are compelled to make provisions for ample reservations, so that today public utility securities with substantial reserves are gilt-edged.

We must use scales to weigh our local utility problems, and withhold public criticism until the real facts are thoroughly known. For instance, one particular case of snap judgment happened in connection with the National War Labor Board during the war. The employees of the street railway in a town of about 250,000 demanded an increased wage. The War Labor Board granted the increase without giving the management a chance to present its side of the case. The matter was later reviewed after the wages had been put in force. It was then found that the street railway company could not meet the increase awarded and the interest on its bonds. It was suggested that the company increase the rate of fare, but it developed that if the rate of fare was increased to meet this over-night increase in wages, the reduction in the number of passengers carried—in the number of people who would stop riding rather than pay this increased fare—would make it impossible for the company to meet its fixed charges. This hurried decision, in fact, placed the street railway corporation in such an embarrassing position that a readjustment of wages and conditions was necessary in order to permit the street railway to survive.

GOVERNMENT OWNERSHIP OR PRIVATE OWNERSHIP

Although at one time sympathetic toward government ownership, I am certain, after a number of years in government service, that no community can receive the industrial service to which it is entitled under municipal or governmental management. The cause for this fact lies in the human element. No city, state or national industrial enterprise can expect to obtain from management, or from men, an average of more than 50 per cent of personal efficiency, or more than 50 per cent of personal interest in their work, and it must be remembered that this percentage will gradually decrease the longer the individual manager or the individual employee is in this industrial government service.

I say again that it is not humanly possible to obtain the same effort or interest from managers or men employed in industrial government service that exists in competitive private ownership, and that as a result, if the advocates of government ownership investigate the facts carefully and impartially, they will find that government operation in industrial service is a flat failure from a "service to the public" standpoint. This is true not only in America but it is a proved fact throughout the world.

If the members of the Chamber of Commerce of the United States of America, with their great power and influence, were to take a keen personal interest in public utilities in their respective states, insisting that justice be given the public and the utilities, a permanent step toward solving this most important problem would be taken.

Swiss Comment on American Electric Locomotives

IN A RECENT issue of *Schweizerische Bauzeitung*, A. Laternser, an engineer of Zurich, Switzerland, compares the qualities of a number of electric locomotives. These, with the conventional designations used abroad,* were as follows: General Electric freight locomotive for Milwaukee Railway (2B + B + B +B2) direct current; General Electric express passenger locomotive for Milwaukee Railway (1B + D + D + B1), direct current; Westinghouse freight locomotive for Pennsylvania Railroad (1C + C1), alternating current; Westinghouse express passenger locomotive for Milwaukee Railway (2C1 + 1C2), direct current; Oerlikon freight locomotive for Swiss Federal Railway (1C + C1), alternating current; Oerlikon express passenger locomotive for Italian State Railways (2C2), three-phase.

Comparing the geared and gearless types, Mr. Laternser disapproves of the latter on account of the low center of gravity and the former on account of the decreasing gear efficiency with increase in speed. He also objects to the large unsprung load in all three types of Milwaukee locomotives mentioned, stating that this produces excessive wear of rails, and calls attention to the fact that the two leading American firms building electric locomotives are not agreed as to the best construction for express passenger and freight types of heavy locomotives. It seems strange to him that both the General Electric Company and the Westinghouse company have had such excellent results with their respective types of construction. He considers the American designs for regeneration to be complicated and not fully reliable, and the whole design of electrical equipment of American locomotives to be more complicated than that of the Swiss Federal type. The two Oerlikon locomotives mentioned are the most powerful yet built for use abroad and are both equipped for regenerative braking.

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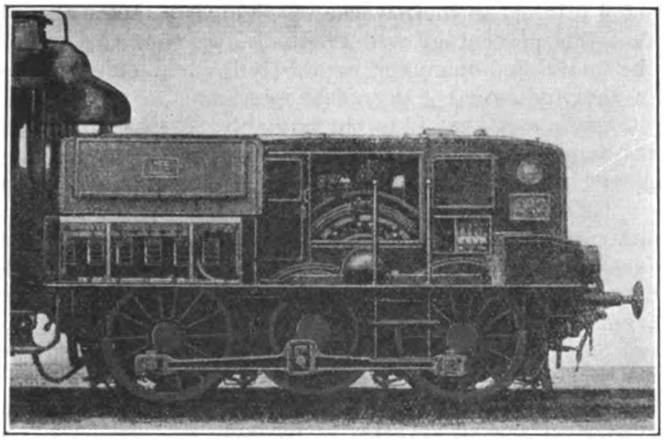
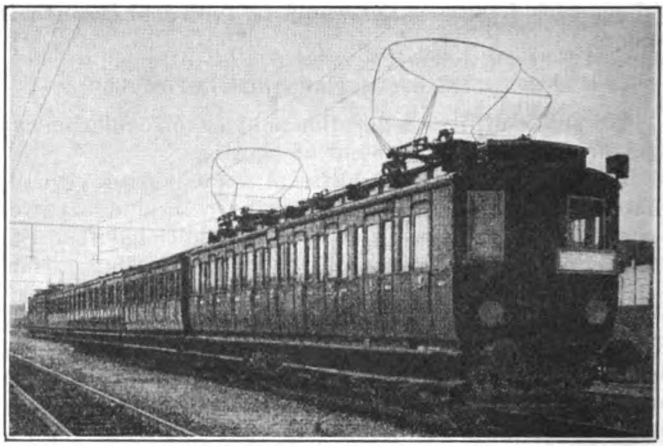
*The wheel arrangement of locomotives is designated thus: Beginning at the front end of the locomotive the number of pony axles is designated by a number, then the number of driving axles on the successive trucks by letters, A representing one driving axle, B two axles, C three axles, etc., a final number being used to indicate the number of pony axles at the rear. If there are any intermediate pony axles their number and position are indicated by numbers properly placed in the symbol.



EXPERIMENTAL ELECTRIC TRACTOR FOR USE ON BERLIN RAPID TRANSIT LINES



EXPERIMENTAL MULTIPLE UNIT TRAINS IN OPERATION IN BERLIN DURING PAST FEW MONTHS

Novel Electric Train Drive in Berlin

Experiments Indicate Superiority of Multiple-Unit Over Locomotive Operation in This Service—Ingenious Application of Electric Tractor Principle Suggests Early Days in This Country

IN THE article by E. C. Zehme appearing in the issue of the ELECTRIC RAILWAY JOURNAL for March 5, 1921, page 438, mention was made of some experiments in Berlin with rapid-transit trains. In a recent issue of the *Zeitschrift des Vereines deutsches Ingenieure* considerable detail is given of the experimental multiple-unit train which is in use, and also of the small electric tractors.

Referring first to the tractor, which is of noticeably low construction (being less than 5 ft. high), it is of interest to note that a complete suburban train, consisting of twelve coaches, has been propelled by two of these tractors, one each front and rear, controlled from the front platform of the first coach. The tractor draws current from a pantagraph mounted on the roof of the first coach.

The tractors contain each a single-phase commutator motor of 600 hp., hourly rating, or 580 hp., continuous rating, with forced air cooling. This drives a jackshaft through a reduction gear with a ratio of 1 to 3.54, and the jackshaft is in turn rod-coupled to the two driving axles. The framework of the tractor is made up largely of cast steel, the lower part of the motor being part of the casting.

Directly above one of the axles is mounted the main transformer, of 650-kva. hourly rating. It is of the air blast type. About one-sixth of the transformer output is required for train heating. A 15-kw. fan provides forced circulation for transformer and motor. On the other side of the motor, and above the second axle, is located an air compressor for operation of brakes, oil switch, pantagraph and rail sanders. Nine taps on the low-voltage winding of the transformer, two choke coils and two small resistors provide for twelve positions of the controller.

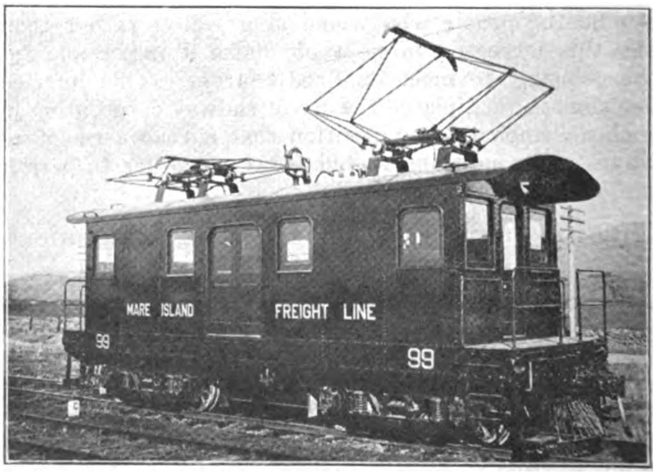
The wheelbase of the tractor is 9½ ft., the wheel diameter 4 ft. 5 in., the complete weight about 75,000 lb., the "unsprung" load 11,500 lb., the maximum speed 40½ m.p.h., the maximum speed of the motor 900 r.p.m., and the drawbar pull at the start 21,200 lb.

The tractor or locomotive plan for operating rapid transit trains in Berlin is, of course, highly experimental. It is doubtful if the rate of acceleration which can be produced with this arrangement is sufficient for local conditions. Another experiment which has been tried within the past few months is the use of motor cars and trailers, each motor car having an hourly rating of about 350 hp. and weighing completely equipped about 68 tons. The experimental train which has been in successful operation during the past winter consists of two motor cars and three trailers.

A Small Single-Phase Locomotive for Use at Mare Island

THE San Francisco, Napa & Calistoga Railway has just completed in its shops at Napa a 50-ton single-phase locomotive. It is to be used to handle government freight between the company's connection at Napa Junction with the Southern Pacific Company and the government's delivery yards at the Mare Island Navy Yard. Mare Island was recently connected with the main land by a causeway built by the government and electrified by the railway.

This locomotive, which was built especially for this service, has an over-all length of 35 ft. and a width of 9 ft. 6 in. The cab itself is 26 ft. long and at each end is a 30-in. platform. It is equipped with four Westinghouse 132-A motors mounted on heavy Baldwin trucks. Westinghouse AMM brake equipment is installed. The motors are geared with a ratio of 16 to 67 to the 34-in. steel-tired wheels. The locomotive takes its power from the 3,300-volt, 25-cycle line through a sliding pantagraph trolley. A 250-kw. transformer fed through an auto-



THE 50-TON SINGLE-PHASE LOCOMOTIVE USED ON THE MARE ISLAND CAUSEWAY matic oil circuit breaker provides suitable secondary voltage through the usual combination of switch groups and preventive coils.

The steel underframe for this locomotive is made in one piece. This single casting, weighing 7 tons, has 13-in. center sills and 10-in. side sills. Buffer plates of ¾-in. boiler iron were riveted around the ends, dropping low enough in the center to carry the pilot and extending around the sides a distance of 30 in. beneath the ends of the cab. Standard A.R.E.A. engine pocket couplers with 3-in. pins are attached through these plates to the steel end sill which forms a part of the underframe casting. The floor space provided for the equipment is 4 ft. x 18 ft. A structure of 3-in. x 3-in. angles with eight posts and suitable screens forms a cage for the inclosure of all apparatus.

Ammeters are placed in the engineer's cab and an Economy wattmeter is provided on the high tension side of the transformer for metering the total energy consumed.

The locomotive is owned jointly by the San Francisco, Napa & Calistoga Railway and the Sacramento Northern Railway.

George A. Hearn, superintendent of equipment, was the designing and construction engineer.

W., B. & A. Has New Terminal in Washington

AS ANNOUNCED in the news columns of this paper for March 19, 1921, the Washington, Baltimore & Annapolis Electric Railroad has begun the use of its new terminal in Washington, D. C. The terminal is located but three blocks from the Treasury Building. The railway purchased approximately one-half of the city block bounded by New York Avenue, Twelfth, Thirteenth and Eighteenth Streets, N. W., laid three new 200-ft. tracks into this yard and constructed new loading platforms. Buildings which were previously on the site have been utilized for waiting room, ticket office and news-stand and also with numerous offices on the upper floors.

FAST ELECTRIC TRAINS
ANNAPOLIS CAMP MEADE
BALTIMORE CHESAPEAKE BAY
U S NAVAL ACADEMY
WASHINGTON BALTIMORE & ANNAPOLIS ELECTRIC RAILROAD

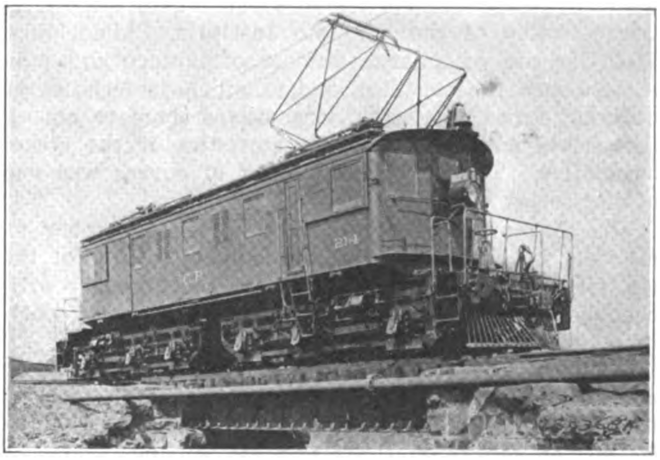
© *Harris & Ewing, Washington, D. C.*

TAKE ELECTRIC TRAIN HERE FOR BALTIMORE

Previous to the construction of this terminal the cars came up only as far as Fifteenth Street on New York Avenue, and loading was done from the street at these locations. The crowds waiting for cars in the streets led to such an interruption of traffic that protests were constantly being made and there were also general objections on the part of the public to the practice of loading these large interurban cars from the street. The new special trackwork was furnished by the Lorain Steel Company.

Paulista Locomotive Ready for Delivery

THE first Baldwin-Westinghouse freight locomotive for the Paulista (Brazil) Railway has been completed and tested. The passenger locomotives are nearing completion. The initial service on the double-track line between Jundiahy and Campiñas, a route-mileage of 28, will be furnished with eight freight locomotives and four passenger machines. Orders for two of each type were obtained by the Westinghouse Electric & Manufacturing Company. The remaining eight locomotives are being built by the General Electric Company.



BALDWIN-WESTINGHOUSE 3,000-VOLT DIRECT-CURRENT FREIGHT LOCOMOTIVE FOR PAULISTA RAILWAY

This electrification marks a milestone in the broad application of the natural resources of Brazil through the replacement of imported coal for power development. These locomotives are to be used in main-line freight service on the Paulista Railway, which is the main broad-gage trunk line of the most prosperous and productive part of the State of São Paulo.

This type locomotive weighs 105 metric tons (231,000 lb.) and has six driving axles each equipped with one 280-hp. direct-current motor. The motors are arranged for operation with two in series on the 3,000-volt line. Each locomotive is designed to handle trailing loads up to 770 tons over a line having a maximum grade of approximately 2 per cent. It is equipped with M.C.B. couplers for testing purposes, which will later be replaced with Continental draft gear. Also vacuum train brakes will replace the temporary pressure brake.

Enormous quantities of coffee, beans, rice, cereals and cattle are transported over this line by thoroughly modern and efficient railroading methods. Electrification is the latest step in the growth and progress of this notable railway, which is one of the most important lines in all South America.

The Denver & Interurban Railroad, Denver, Col., is planning to span South Boulder Canyon at Eldorado Springs with a suspension foot bridge. This canyon is one of the most picturesque chasms of Colorado and the new bridge will afford a wonderful view of the mountain scenery. The cliffs rise above the water of South Boulder Creek more than 1,000 ft. on the north side. On the south side of the canyon Castle Rock Cliff is a precipice of only 650 ft., so the bridge will be suspended in the air about 600 ft. because of the topography of the cleft forming the gateway. The company expects to go ahead with the proposition as soon as financial conditions will permit.

Electric Locomotive Characteristics

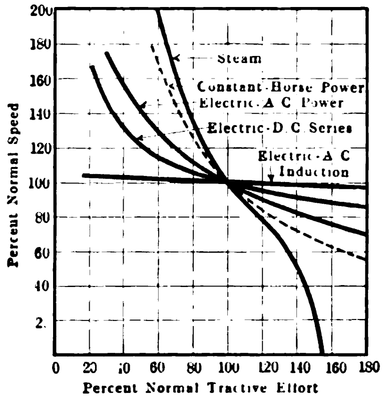
Engineer of Manufacturing Company Discusses Qualities of the Several Types of Locomotive Available and Outlines the Well-Known Advantages of Electric Motive Power

ON APRIL 14 N. W. Storer, of the general engineering department of the Westinghouse Electric & Manufacturing Company, read a paper before the electrical section of the Franklin Institute, Philadelphia. With the aid of a large number of lantern slides he showed how the electrical and other characteristics of different types of electric locomotives compare among themselves and with the characteristics of the steam locomotive. The accompanying set of curves was one of the series which he showed.

Mr. Storer discussed his topic under a number of different heads, listing thus the salient features of the electric locomotive and accompanying the summary with comments and illustrations. The principal points which he made were briefly as follows:

With the electric locomotive the power that can be applied to a train is in no way limited by the size of the individual motive-power unit. Theoretically the locomotive can draw the maximum amount of power that can be utilized at one point in the train.

With the electric locomotive the length of the operating division of a railroad is no longer limited by the locomotive. A record for a continuous twenty-four-hour run of 766 miles has been reached by passenger locomotives on the Chicago, Milwaukee & St. Paul. Electrification permits radical changes in terminals, due partly to the absence of smoke, dirt and noise and very greatly to the application of multiple-unit car equipment for the suburban traffic. The advantages in the use of the electric locomotive for long tunnels is obvious.



CURVE SHOWING SPEED-TRACTIVE EFFORT CHARACTERISTICS FOR STEAM AND ELECTRIC LOCOMOTIVES

Electrification involves conservation in fuel.

Due to the greater capacity which can be secured from the locomotive unit, electrification results in greater effectiveness of labor.

Increased reliability of motive power is also an important feature of electrification.

The characteristics of the electric locomotive that make it so desirable may be summarized thus: Its maximum tractive effort is from two to four times its normal continuous running tractive effort. Due to the fact that the capacity of the electric locomotive is limited by the heating of the motors, it can easily develop considerably more power in cold weather than warm. Practically all of the wearing parts of the electric locomotive have normally a long life.

Mr. Storer then discussed the characteristics of the several types of electric locomotives. He said that the characteristics of the direct-current locomotive are especially suited for railway service, since the speed curve falls rapidly as the tractive effort increases. The alternating-current locomotive does not have the ability to produce the high starting torques which are possible with the direct-current locomotive, but on the other hand the speed control is more easily and efficiently obtained by voltage variation. The induction-motor locomotive utilizes the constant speed characteristics of the induction motor. This motor is capable of producing very heavy starting torques and of carrying heavy load, but on heavy loads the speed is maintained at practically constant value and the power required increases practically in proportion to the tractive effort. It is necessary, therefore, to have a motor of greater capacity than with the series motor to take care of peak load. Regenerative braking may be obtained with any of the three classes of locomotives. It should be applied on locomotives which are to be operated over heavy grades, but for level or light grade sections the advantage will hardly be worth the complication.

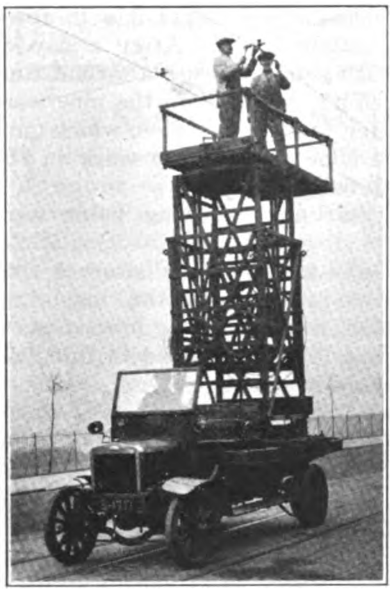
Wheel Welding in Terre Haute

FOR two and one-half years M. M. Nash, superintendent of railways and master mechanic of the Terre Haute Division, Terre Haute, Indianapolis & Eastern Traction Company, has been making extensive use of the resistance type of electric welder in reclaiming all manner of car equipment, including interurban car wheels and axles. During this period 2,500,000 interurban car-miles have been operated on the division and only one set of eight wheels has been replaced for flange wear. On all other wheels thin flanges and wheels otherwise worn have been built up and corrected by welding without removing them from the car. Not only have flanges been welded but they have been rewelded, and some of them have mileage records approaching 200,000 miles. These wheels are put out on the road in fairly fast interurban service just as the welders leave them, without any smoothing up, as the company has no wheel lathe in the Terre Haute shop. In exceptional cases a wheel-truing brakeshoe is used for a short time. Mr. Nash says the wheels are sometimes a little noisy when they are first put out on the road, but the rough surface soon smoothes out and he claims he has never had a derailment or flange breakage, more than a small chip, as the result of the welding work. "Railox" electrodes are used for welding the wheel flanges. Where a chip breaks out of the flange it is filled in again, but the projection of the new metal is not smoothed off. This takes care of itself.

A further step recently devised to prolong the life of a pair of wheels, in the absence of a lathe, is the burning off with an acetylene torch of the second flange which sometimes develops on the tread of a wheel. After this burning process is completed no attempt is made to smooth up the tread. The tread and flange are merely permitted to wear smooth in service.

The new Materials Handling Division of the American Society of Mechanical Engineers is planning sessions for the discussion of design and construction of machinery for road building, at the society's spring meeting, to be held at the Congress Hotel, Chicago, May 23 to 26. Four papers will treat this problem from the viewpoint of the contractor, the road builder, and possible future development of mechanical equipment in road building. The work of this division, whose membership is rapidly approaching one thousand, is now well under way.

Removable Tower Used for Making Overhead Repairs

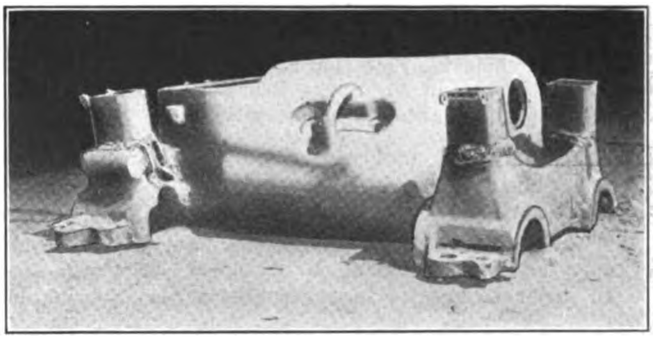

REMOVABLE TOWER IN USE

THE accompanying illustration shows a removable tower used by the Edinburgh Corporation Tramways which is bolted to a lorry for use in making overhead repairs and which is readily lifted off when not needed. This leaves the lorry free for other work. This type of tower has also been found very convenient as an aid in the erection of some new overhead runway in the machine shop extension of this road. The tower was bolted to a low truck to facilitate its being moved about and the overhead railing was removed to provide necessary clearance.

One Way to Enlarge Oil Boxes

THE disadvantage of the small oil box on the frames of old motors such as the GE.-57 has, of course, been recognized for a long time and many ways of enlarging these have been tried.

The Little Rock (Ark.) Railway & Electric Company has some of these motors and has found a novel and satisfactory way of enlarging the oil boxes. Sections of old boiler tubes 4 or 5 in. long, 3½ in. in diameter, are first squared up and made to fit the opening of the box on the motor frame. The section of pipe is then welded to the motor frame, thus adding considerable capacity to the oil box. A cover, retained with a spring, is then put on top of the section of pipe. This work was started with the use of the two Indianapolis welders which the company has for doing trackwork. Recently a Wilson motor-generator set was added. This is now used for most of the work in the shop and also for bonding, and the Indianapolis welders are being used for trackwork. In an accompanying illustration is shown a GE-57 motor frame with the enlarged oil box.

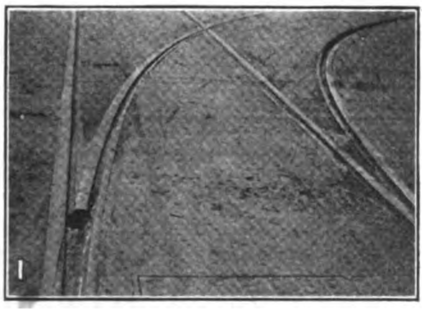

GE-57 MOTOR FRAME WITH SQUARED SECTIONS OF 3½-IN. PIPE WELDED TO ENLARGE OIL BOXES

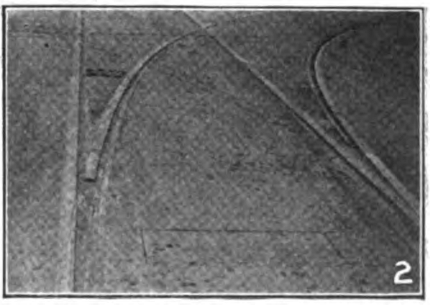
Reclaiming a Cast-Steel Mate

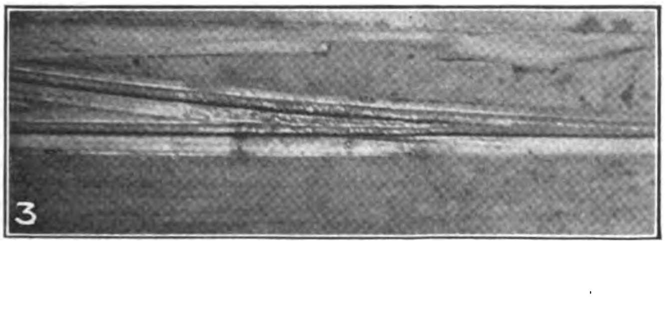
FOUR accompanying pictures illustrate the success which is being obtained in the track department of the Dallas Railway under the direction of B. R. Brown, engineer maintenance of way and overhead construction, in reclaiming bad special trackwork. The particular job pictured shows a cast-steel mate in which a hole was broken down through the casting. The hole was filled up with slugs of iron and soft metal was fused into a solid mass to support the surface welding.

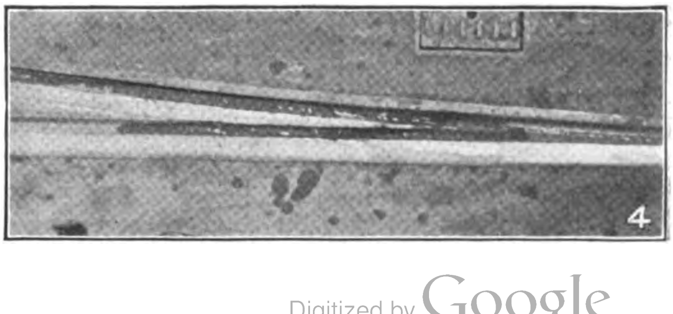
The mate was then built up by means of a hard steel electrode known as the A-steel of the Indianapolis Switch & Frog Company. The plane surface was properly finished by means of a reciprocating grinder and an Atlas rotary grinder was used for shaping up the point and flangeways. This job was done in forty hours by a welder and helper. After being in service for a period of six months the mate showed no signs of deterioration.

Very good success has also been had in welding solid manganese railroad crossings when in extremely bad condition. Mr. Brown says that the secret of this work lies in the mechanic who does the job and that it is simply a matter of knowledge as to how best to handle the metal.









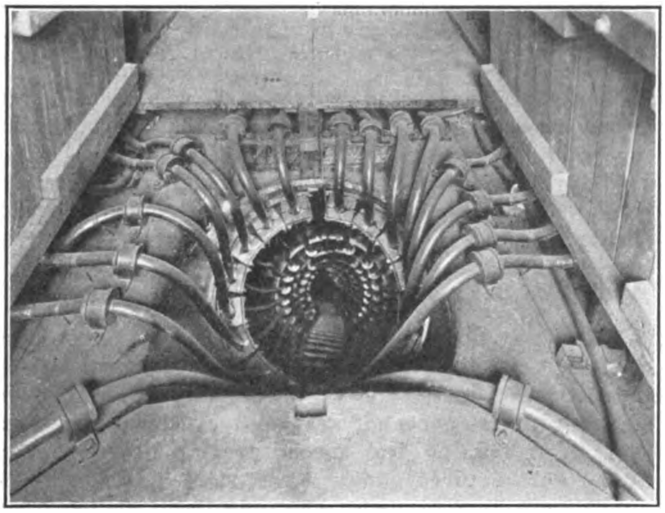
NO. 1—HOLE BROKEN THROUGH CAST-STEEL MATE IN DALLAS. NO. 2—APPEARANCE AFTER HOLE HAD BEEN FILLED WITH SOFT METAL. NO. 3—APPEARANCE AFTER THE MATE POINT HAD BEEN FORMED AND WELDING COMPLETED. NO. 4—THE COMPLETED JOB AFTER GRINDING

Painting Under Difficulties

Inside of Submarine Pipe Had to Be Painted by Workers in Pipe Using an Air Spray Brush—Work Done at Night, When Power Was Off

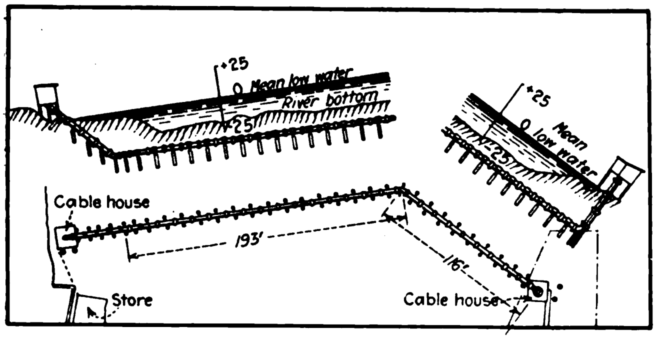
PAINTING the inside of a pipe 36 in. in diameter and more than 340 ft. long is a job to be avoided rather than sought, is the probable opinion of the two operators who recently completed such a job for the Connecticut Company at Bridgeport.

In order to get its feeder cables across the Pequonnock River at Bridgeport the Connecticut Company in 1906 laid down this 36-in. pipe, as shown in an accompanying illustration. At that time nine 750,000-circ.-mil lead-covered cables were installed, just laying them in the pipe. In 1913 eight 1,000,000-circ.mil cables were added, and at that time, in order to arrange the cables more satisfactorily in the pipe, they were placed on insulating brackets, as shown in another accompanying illustration. The third illustration shows a view looking down into the top of the 45-deg. section of pipe on the west side of the river.



LOOKING DOWN INTO WEST END OF PIPE, SHOWING CABLES MOUNTED ON INSULATORS

It was found a few months ago that the inside of the pipe was corroding badly and it was decided to paint it. On account of the fact that it was desired to have the cables remain insulated from the pipe itself it was necessary to use an insulating paint.



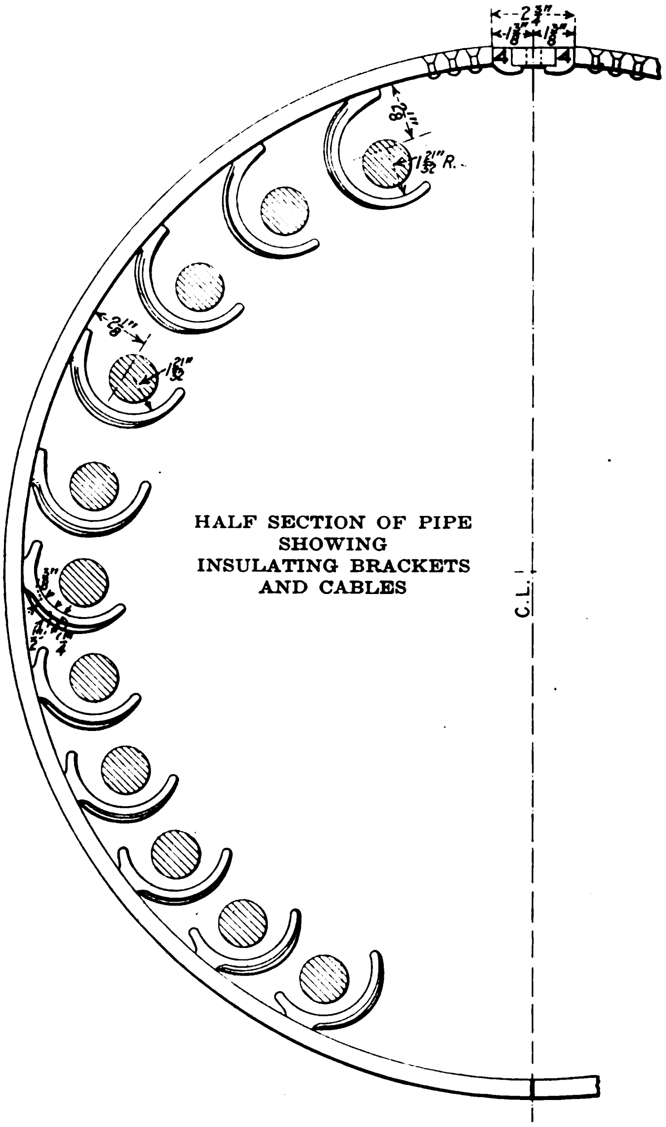
SKETCH OF FEEDER CABLE PIPE INSTALLATION, SHOWING RELATION TO RIVER

The paint was thinned with gasoline and applied with an air spray brush. The work was done by two men, working four hours at a time at night, when the power was off; they progressed about 45 ft. per night.

When the men approached the point where the vertical section of pipe meets that section which goes directly under the river, which is the lowest point on the whole system, the men were overcome by the gasoline fumes, it having been found impossible to force air through the pipe satisfactorily. After a day or two of rest, they tried it again and were a second time overcome. Strenuous efforts to ventilate the pipe were made, and finally a suction fan was installed, which gave sufficient circulation to allow the men to work in the pipe satisfactorily and finish the job.

About 120 gal. of Stérling insulating paint were used to complete the job.

An interesting sidelight on this installation is that after these cables were installed on the insulating brackets a workman felt a shock, and, upon test, a string of five lamps in series were lighted to full brilliancy between the cable sheath and ground. All such tests were made for a period of a minute or more, each time, and no explanation could be found. Finally, one string of lights was left on for several minutes, and it was noted that after about two minutes the lights went out. This was found always to be the case, as the test was applied to other cables, and it was finally decided that there was enough static charge in the cable sheath to maintain this current for that length of time. Accordingly, all cable sheaths were grounded, through 2-amp. fuses, and no trouble has been noted.



HALF SECTION OF PIPE SHOWING INSULATING BRACKETS AND CABLES

Association News

National Electric Railway Day

THE association's advertising section for the committee on publicity reports that the success of the National Electric Railway Day idea far exceeded their anticipations. Much publicity for the industry attended the demonstrations both in the papers and by the film service weeklies. Where there were no demonstrations local papers gave considerable space to stories pertaining to the development of the local traction company.

Of the demonstrations marking the day that of Richmond, Va., the home of the electric railway, is probably the most striking. After several weeks' search the body of one of the cars used on the original electrified line was unearthed, fitted with new trucks and, with the Mayor and other city officials as escorts, was paraded over the streets used by the original route.

Other demonstrations of importance were held in Minneapolis and St. Paul. Here horse car No. 1, which was first put in service in St. Paul on July 17, 1872, was driven through the business section of both cities by the employees who formerly used the car in their daily runs. A score or more persons who also used the car when it was in service again rode as passengers. The trainmen's band led the demonstration, which also showed the growth of the cars used on that system.

Many of the various news film service companies as well as national still life photographers were busy in each of these places obtaining pictures for showing all over the country in the topical news weeklies.

In New Bedford there was also a unique demonstration. The company got out one of the old horse cars and in order to arouse enthusiasm on the part of the public offered a year's free transportation to the oldest person riding on the car. It is understood that there were more than a dozen competitors, the oldest one of whom was 82. The Boston papers gave considerable space to the event.

The papers also took hold of the news features and in many cities a considerable amount of space was given over to the history and development of the local traction company. A particularly good story concerning Reading, Pa., was printed in the local papers. The Eastern Pennsylvania Railways made wide use of the folders and other publicity sent out by the association.

The association's department of publicity has asked the various railways to send clippings and photographs showing what was actually done in their community not merely as a matter of record but for use in helping others to put over similar ideas at a later day.

Car Design Committee at Work

APPOINTMENT by President Gove of the committee of the American Electric Railway Engineering Association authorized at the last convention for the purpose of developing "anticipatory standards" of car design has been made. Under the direction of the chairman, H. H. Adams, superintendent of equipment Chicago Surface Lines, the work of this committee is already well under way. The rest of the personnel of the committee is equally divided between representatives of the car builders and railway companies, as follows: H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J.; J. A. Brooks, chief draftsman the J. G. Brill Company, Philadelphia, Pa.; J. W. Hulme, superintendent of equipment International Railways, Buffalo, N. Y.; G. L. Kippenberger, assistant to vice-president St. Louis Car Company, St. Louis, Mo.; John Lindall, superintendent rolling stock and shops Boston Elevated Railway; V. R. Willoughby, assistant general mechanical engineer American Car & Foundry Company, New York.

In a recent interview, Mr. Adams summed up the objects of the committee as being "to develop uniformity of car design out of the chaotic conditions existing at present, and ultimately leading up to the question of standardization." The committee has started out on its work by proceeding to gather information and data covering present practices in car design, limiting itself at first to a study of double-truck closed city car construction. To this end, Mr. Adams prepared a questionnaire which was sent to the members of the committee only, and which will bring back data to the chairman from which a comprehensive compilation of car dimensions can be made and analyzed and summarized. Through the very generous co-operation of the car builders represented on the committee, it will be possible readily to secure accurate data on a wide range of car designs built during the last five years, without having to call upon the railway companies.

After these data are compiled, Mr. Adams plans to call the committee together to make a study of the situation and endeavor to arrive at certain uniform dimensions to be embodied in car design, such as post centers, height and widths of body, side and roof dimensioning and construction, window sizes, seat dimensions and numerous elemental parts. Mr. Adams is of the opinion that it should be readily possible to bring about such uniformity in these details of design that cars of varying lengths can be made by simply adding or subtracting standard sections. Whether a car is of the double-end, center-entrance or Peter Witt type does not enter into the consideration, for each of these types could be built with a large part of the car body made up of the uniform sections.

C. E. R. A. Committees Announced

PRESIDENT A. C. Blinn of the Central Electric Railway Association has announced the following committee appointments for the current year:

Auditing.—Walter Shroyer, chairman, Anderson, Ind.; L. T. Hixon, Indianapolis, Ind.; E. O. Reed, Lima, Ohio.

Annual Transportation.—Bert Weedon, chairman, Indianapolis, Ind.; C. J. Laney, Akron, Ohio; J. F. Starkey, Sandusky, Ohio; W. S. Rodger, Detroit, Mich.; C. O. Sullivan, Lima, Ohio.

Constitution and By-Laws.—Arthur W. Brady, chairman, Anderson, Ind.; Charles L. Henry, Indianapolis, Ind.; F. W. Coen, Sandusky, Ohio; Frank R. Coates, Toledo, Ohio; E. F. Schneider, Cleveland, Ohio.

Finance.—James P. Barnes, chairman; Louisville, Ky.; T. A. Ferneding, Dayton, Ohio; F. R. Coates, Toledo, Ohio; F. W. Coen, Sandusky, Ohio.

Hotel and Arrangements.—S. D. Hutchins, Westinghouse Traction Brake Co., chairman; Harry L. Brown, ELECTRIC RAILWAY JOURNAL; John Benham, International Register Co.; L. E. Gould, Economy Electric Devices Co.; C. Dorticus, General Electric Co.

National Safety Council.—Harry A. Nicholl, chairman, Anderson, Ind.; J. W. Giltner, Akron, Ohio; R. A. Crume, Dayton, Ohio; A. Swartz, Toledo, Ohio.

Publicity.—Harry L. Brown, ELECTRIC RAILWAY JOURNAL, chairman; H. J. Kenfield, *Electric Traction*; C. J. Laney, Akron, Ohio.

Resolutions.—Robert I. Todd, chairman, Indianapolis, Ind.; Garrett T. Seely, Youngstown, Ohio; Samuel W. Greenland, Fort Wayne, Ind.

Rules Governing Interchange of Equipment.—John F. Collins, chairman, Jackson, Mich.; F. R. Coates, Toledo, Ohio; F. W. Coen, Sandusky, Ohio; G. B. Dobbin, Akron, Ohio; Harry Reid, Indianapolis, Ind.

Education and Training of Employees.—James P. Barnes, chairman, Louisville, Ky.; H. C. DeCamp, Westinghouse Electric & Manufacturing Co.; Edwin M. Walker, Terre Haute, Ind.

Standardization and Bureau of Standards.—H. H. Buckman, chairman, Scottsburg, Ind.; P. V. C. See, Akron, Ohio; J. W. Osborne, Lebanon, Ind.; G. H. Kelsay, Elyria, Ohio; John oll, Louisville, Ky.; M. F. Skouden, Anderson, Ind.; Charles Ellis, Cincinnati Car Co.; K. D. Leavitt, Dayton, Ohio; R. C. Taylor, Taylorville, Albion, Mich.

Uniform Changes for Repairs to Interchanged Equipment.—F. W. Coen, chairman, Sandusky, Ohio; J. W. Glendenning, Jackson, Mich.; Harry Reid, Indianapolis, Ind.

Program.—Samuel W. Greenland, chairman, Fort Wayne, Ind.; F. D. Carpenter, Lima, Ohio; H. A. Nicholl, Anderson, Ind.; L. G. Parker, Cleveland Frog & Crossing Co.; H. C. DeCamp, Westinghouse Electric & Manufacturing Co.

Transportation.—Harry Reid, chairman, Indianapolis, Ind.; C. J. Laney, Akron, Ohio; J. F. Starkey, Sandusky, Ohio; W. S. Rodger, Detroit, Mich.; Bert Weedon, Indianapolis, Ind.

Electric Railway Express.—C. J. Laney, chairman, Akron, Ohio; W. S. Rodger, Detroit, Mich.; J. F. Starkey, Sandusky, Ohio; G. K. Jefferies, Indianapolis, Ind.; H. A. Nicholl, Anderson, Ind.

Supplymen.—E. C. Folsom, Railway Materials Co.; C. B. Arthur, Universal Lubricating Co.; W. D. Hamer, W. D. Hamer Co.; Nic LeGrand, National Safety Car & Equipment Co.; H. C. DeCamp, Westinghouse Electric & Manufacturing Co.; C. F. Wickwire, Ohio Brass Co.; L. G. Parker, Cleveland Frog & Crossing Co.; C. Dorticus, General Electric Co.; Myles B. Lambert, Westinghouse Electric & Manufacturing Co.; J. E. McLain, Trolley Supply Co.; James H. Drew, Drew Electric & Manufacturing Co.; F. N. Root, Root Spring Scraper Co.

Track and Roadway.—F. R. H. Daniels, chairman, Indianapolis, Ind.; T. H. Sundmaker, Springfield, Ohio; L. A. Mitchell, Anderson, Ind.; A. V. Brown, Sandusky, Ohio; H. D. Sanderson, Jackson, Mich.; E. D. Eckroad, Akron, Ohio.

These Ties Have Long Life

SOME facts regarding track laid with cedar ties in 1869 by the Chicago, Milwaukee & St. Paul Railroad were recently reported by the railway maintenance engineer. After fifty-two years about 2,000 of the original ties, or 15 per cent, are still in the track. The ties are in a stretch of 14 miles between North Milwaukee and Cedarburg. During the period mentioned the track has been relaid with several sections of rail, and the ties have also undergone one shifting and shortening.

Auto Transportation in California

Motor Truck and Bus Must Get Permission to Operate for Hire Over the State's Improved Highways—A Veritable Network of Auto Lines

A MARKED feature of the work of the California Railroad Commission during the year ended June 30, 1920, according to the commission's report, resulted from the development of the state's youngest utility—transportation by motor truck and stage. Given impetus during the war by the demand for added transportation facilities, the auto, both freight and passenger carrying, developed rapidly as a common carrier. California's wonderful road system lent itself to this development. Today the state is served by a veritable network of auto lines, and the demand for operating permits is ever increasing. The extent of this type of service is indicated by the number of certificates issued by the commission. There are about 900 legally established operative rights on file.

The usual mistakes have been made during the course of its development prior to the time jurisdiction was vested in the commission. Inexperienced persons, armed only with a desire to enter the auto traffic field, without any knowledge of the dangers that lurk in all new businesses, without training to fit them for conducting a transportation utility (except ability to drive a truck or car), took advantage of the fact that there was need for additional carriers and entered the lists. The number of transfers of permits authorized by the commission shows better than anything else the fate of the pioneers. Exigencies of the rapidly growing service, resulting from financial needs and traffic demands, which they could not meet, forced them to dispose of their routes. This later development, under the extended jurisdiction of the commission, has been carefully guided. Today the auto transportation field is receiving the most careful attention. Haphazard operation is not possible; permits are issued only on a showing that public convenience and necessity require additional transportation facilities in the district sought to be served. There has been established by this commission a high standard of service by auto carriers, maintained through a system of inspection, that insures for the traveling and shipping public a maximum of safety and comfort and efficiency. Rules and regulations have been designed by the commission for the guidance and control of the public patronized auto, and their enforcement, in the opinion of the commission, will ultimately result in the high standard of service sought.

One of the reasons for this auto transportation development is that in the last nine years the counties of California have spent more than $125,000,000 on highway development. In this time the state has also spent $50,000,000, so that now there is said to be in California five times the mileage of hard surface roads that exist in any other state. The climate is conducive to all-year-round automobile travel and electric railways must concede that these two things are bound to increase automotive competition.

Competition, however, is not altogether an urban proposition, for it is possible to travel from San Francisco to Los Angeles, a distance of more than 500 miles, by auto bus. All motor buses operating outside the city limits come under the jurisdiction of the Railroad Commission.

Recent Happenings in Great Britain

From Our Regular Correspondent

Increasing attention attaches in England to the trackless trolley because of the general need for economy and the desire to make haste slowly with respect to expenditures for new undertakings. In London, on the other hand, the co-ordination plan for the transit lines appears to be off for the present. The news, however, all points to the spirit of caution with which changes of all kinds are being approached.

FROM several parts of Great Britain comes evidence of a pending development of the use of the trackless trolley system. For a number of years a few installations of this system have been in successful use in England, but hitherto it has not been largely adopted. Before the war tramway track construction as well as labor were comparatively cheap, so that a tramway could meet expenses though the traffic was not very heavy. The railless car was accordingly used on routes where traffic was really light.

Even in districts of that sort some traction authorities preferred the petrol motor omnibus, partly because it is not confined to fixed routes of travel and partly because there is no initial expenditure on providing and erecting poles and overhead wires. There is also the fact that in many cases Parliamentary powers are necessary to authorize the poles and wires, while, except in the case where a local authority is the operator, no Parliamentary sanction is required to run petrol omnibuses.

TRACKLESS CAR COSTS LOW

All along, however, the trackless electric car could be worked at a lower cost per mile run than the automobile bus, and since the war this difference has been accentuated owing to the fact that the price of petrol has gone up more than the price of electricity.

Some tramway authorities—indeed probably a good many of them—possess Parliamentary powers to construct extensions which have not been carried out owing to the prohibitive cost of track construction. Other tramway undertakings would no doubt during the last two years have sought powers for extensions, but have refrained for the same reason. Most of the contemplated lines would be on suburban routes of light or medium traffic. To meet this case, therefore, the trackless trolley system is having a favorable eye turned on it.

In Bradford especially there is much prospective activity in this direction. There is the drawback that it seems to a local authority even if engaged in working tramways cannot work trackless cars without getting specific Parliamentary authority. Even if this is so, the difficulty is far from insuperable. So far, however, as Bradford is concerned, the powers now exist for the Bradford Town Council has already run trackless trolley cars, and the same is true of several other local authorities. The Minister of Transport has agreed to Bradford Town Council operating one-man railless electric vehicles, so further economy is in sight.

R. H. Wilkinson, the borough tramway manager at Bradford, has designed a car of the sort which will be driven by one electric motor. It is a single-deck car and will seat thirty passengers. To remove objections to the weight of a larger double-deck trackless car, Mr. Wilkinson has got out a design for a six-wheel vehicle. Half the weight is on the rear axle and the other half distributed equally between the other two axles. The seating capacity is twenty-four on the lower deck and thirty-three on the upper, and the overall length is 23 ft. 10 in. A 60-hp. motor will be used.

The Town Council at Leeds, which also already run trackless cars, is about to experiment with a vehicle of this kind fitted with penumatic tires. It will be double-deck car seating fifty passengers in all. Another novelty is that the drive from the motor will be through the front wheels. In Glasgow it is proposed to proceed with the construction of some authorized tramway extensions, and also to experiment with the trackless trolley system on one route.

The prospect of a co-ordinated development of all methods of London local passenger transportation has again been postponed indefinitely. Sir Eric Geddes, Minister of Transport, stated in the House of Commons on March 21 that a bill for the establishment of a London Traffic Authority had been under consideration by the government but in view of the general need for economy, both in money and in Parliamentary time, it had been decided that it was not desirable to proceed with the bill at present. Moreover, the proposal was so highly contentious that it seemed impossible to deal with it until some of the matters in dispute had been eliminated. Further, it seemed hopeless to carry out the proposal unless the British Exchequer financed it, and that was a matter of great difficulty at present.

TRAFFIC BOARD FOR LONDON

It may be recalled that within the last year or so a select committee of the House of Commons and an advisory committee of the Ministry of Transport after inquiries recommended the constitution of a traffic board for London to co-ordinate services and guide new development. This proposal only confirmed the recommendations of various expert bodies which examined the subject in past years. Broadly it may be said that the transport undertakings of the metropolis are in favor of having a traffic board, but there are so many local authorities and other bodies entitled to have a say and there is so much difference of opinion among them that prospects of a solution are not bright. Apart from that the government is now engaged in a great economy campaign. It is cutting down expenditure in many directions, and there is little chance of any new expenditure being sanctioned except for objects that are urgently necessary.

LARGEST BRITISH POWER STATION

One or two interesting points may be cited from the speech of R. P. Sloan, manager of Newcastle-upon-Tyne Electric Supply Company, at the annual meeting which was held on March 22. The company, long a successful one, supplies electricity for many purposes, including traction. Mr. Sloan said that the profits for the year were £392,643, or £144,449 in excess of those for 1919. This was a disappointing year, as the increase was only £50,249 above 1918. The extensions of Carville power station were now completed, making this station, which now had a capacity of more than 130,000 hp., the largest electrical generating station in operation in the United Kingdom. The North Eastern Railway main line electrification scheme had not yet materialized, but negotiations had been re-opened by the railway company and there was reasonable hope that the scheme could be proceeded with although on a somewhat smaller scale than was first contemplated. In the event of the scheme maturing and proving a success there was every likelihood of its leading to much larger developments.

J. H. Armstrong, the chairman, referred to his retirement from that post and said that on his suggestion Mr. Sloan would become chairman and managing director. Mr. Sloan had been manager for more than sixteen years. He came to the company with the birth of the power scheme—the first one to be established in the United Kingdom and he believed in the world—and had nursed it into the powerful and well-developed being it was now. Mr. Armstrong will continue in office as vice-chairman of the company. He received from the meeting tributes of appreciation of his services.

Proposals are being made by Manchester and by some other places to give the local authority power to prevent other vehicles from being driven past tramcars on the nearside when the cars are stopped for setting down and taking up passengers. The idea is to secure the safety of passengers, and though the plan has been worked for some time in Glasgow it seems likely, in the case of streets of very dense traffic, to cause much street obstruction.

Arrangements are being pushed forward for electrifying the whole of the cable tramway system of Edinburgh at an estimated cost of £825,000. The manager is of the opinion that the saving in working expenses will more than cover the interest and sinking fund charges on the new capital.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Franchise Surrendered

Duluth Street Railway Company Goes Under New Law, but Rejects Cost-of-Service Proposal

The Duluth (Minn.) Street Railway has elected to operate under an indeterminate permit perpetuating the existing franchise grants and permitting fares to be fixed by the State Railroad & Warehouse Commission, under authority of a statute passed by the 1921 Legislature. At the same time the company has announced its intention to reject the cost-of-service franchise, prepared by a committee of Duluth engineers. The company's attorneys hold that the proposed franchise conflicts with the city charter in so far as the provision with reference to rates is concerned.

Request for an indeterminate permit has been filed with the city clerk and under the law recently passed by the Legislature it becomes the duty of that officer to furnish the company with a certificate, which is then filed with the Secretary of State. The city, in turn, is also required to issue the indeterminate permit. Under the proposed engineers' franchise the rates would be determined by means of a contract between the city and the company providing that the fare charged should vary inversely with the dividend rate allowed.

As noted in the ELECTRIC RAILWAY JOURNAL for April 30 the recent legislation gives to the City Council complete control over services, extensions and routing and makes the local governing bodies parties to the valuation proceedings before the state commission. The state commission, however, is given exclusive and initial right to regulate rates, subject to appeal to the courts. Indeterminate permits are authorized to take the place of the present franchises of the railways. These permits, however, are subject to revocation by the Legislature.

In Duluth the company will withdraw its action now pending in the federal court by which it hopes to obtain a temporary injunction against the city from proceeding with an action in the state courts to enforce it to give additional service on several of its lines, providing that the State Railroad & Warehouse Commission looks favorably on an application for an increase in fares.

A. M. Robertson, president of the Duluth Street Railway, has made a statement covering the company's views on the matter of the rejection of the proposed cost-of-service franchise and on its election to proceed under an indeterminate permit. He said in part:

> Our attorneys have given us legal opinion that the cost-of-service franchise prepared by the Engineers' Club, with reference to rate of fare, is in direct conflict with the city charter and could not be made operative without an amendment to the city charter. In view of this opinion there is no other course open to the company than to file with the city clerk written declaration that it desires that its existing franchise grants shall become an indeterminate permit under the provisions of chapter 278, laws of Minnesota, 1921.
>
> It is of the utmost importance that the company obtain financial relief through an increase in fare, which will enable it to make necessary permanent improvements, render satisfactory service and give to its stockholders a reasonable rate of return on a fair value of the company's property, as provided for in the state law. The company will, as soon as possible, make application to the Railroad & Warehouse Commission for an emergency or temporary rate of fare pending a valuation of the property.
>
> The officers of the company believe that the new state law affords a foundation upon which its credit may be restored and which will put it in a position to meet the demands of the city for extensions, additional service and permanent improvements, as the same are needed from time to time.
>
> As soon as the company shall receive the needed financial relief through increased revenues it proposes, in co-operation with the City Council, to do first those things for which there is the most pressing demand, and it asks from the City Council and the people of Duluth reasonable co-operation in its efforts to build up the property to its pre-war physical condition.

Injunction Invoked in New Orleans

In anticipation of hostile action by the State authorities to the collection of the present 8-cent fare Receiver O'Keefe of the New Orleans Railway & Light Company petitioned Judge Foster, of the Federal District Court, for a temporary injunction against the Attorney-General and Assistant Attorney-General of the State, enjoining them from bringing suit in any form against the company.

The injunction was granted on April 29, hearing upon the prayer of the receiver's petition having been set for May 3. Decision was expected to be made then whether the injunction will be made permanent or set aside and the State allowed to proceed with the suits which it is alleged Assistant Attorney-General Hall contemplates filing against the company.

The application for a temporary injunction against the State authorities grows out of threats which Receiver O'Keefe alleges Judge Hall, Assistant Attorney-General, has made in the public press and elsewhere of taking action against the railway or some of its units for forfeiture of charters, franchises and rights.

It is further alleged by Receiver O'Keefe that such action is contrary to the decree of Judge H. B. Clayton, issued on April 21, in which the city was enjoined from interfering with the collection of an 8-cent fare by the railway.

Ambitious Missouri Project

Preliminaries Being Arranged for Construction of Electric Railroad from Kansas City to St. Louis

The Missouri Central Construction Company is underwriting and doing construction work on an electric interurban railway to connect Kansas City and St. Louis, 248 miles. The line is to be known as the "St. Louis-Kansas City Short Line." The company has now secured three-fifths of the right of way, and more than 30 miles are now graded. It is said that $380,000 has to date been put into the project. The company is moving slowly, with a minimum of local publicity through the state and at terminal cities.

Two of the principles governing location of route hold particular interest. The electric line is being located to serve rural Missouri between the terminals, and therefore (1) avoids rather than touches the larger towns; (2) does not parallel closely the steam lines.

The company is not selling stock to farmers, nor offering it to them, in connection with right-of-way negotiations. This policy was taken because of the possible implications that might rest against the company should it make stock subscriptions a condition of route location. It is said that one of the most serious handicaps to present location and securing of right-of-way is the remembrance by farmers of previous similar projects not carried through in connection with which stock was sold to farmers selling land for right-of-way.

The president of the Missouri Construction Company is George R. Collins, president of the National Benevolent Society, a fraternal insurance organization with headquarters at Kansas City. Mr. Collins was active in securing a right-of-way between Kansas City and St. Joseph, Mo., a suit concerning this right-of-way resulting in a judgment under which the Kansas City, Clay County & St. Joseph Railway paid a large sum to Mr. Collins and associates, this company eventually building and operating an electric interurban between the two cities.

Thomas F. Marshall, vice-president of the company, is a capitalist at Marshall. He is active in the work of securing right-of-way. Harvey D. Taylor, secretary, is an attorney. Frank E. Lott, treasurer, is a real estate operator at Kansas City, who has been active for several years in promoting the enterprise. The consulting engineer is W. B. Cauthorn, Columbia, Mo. The right-of-way office is at 501 Finance Building, Kansas City.

Philadelphia Wages Cut

Seven and One-Half Cents Taken Off Trainmen Under Wage Average Plan

Announcement was made on April 28 by the Philadelphia (Pa.) Rapid Transit Company that a general reduction of 7½ cents an hour would be made in the wages paid to the company's trainmen, the reduced wage scale to become effective on May 1. It is also proposed to reduce the wages of track laborers, trackmen, pavers, rammers, switch cleaners and drivers by 14½ cents an hour, this cut also to become effective at once.

The change in wages, it was said, will adjust the company's scale to the average of the scales of the railways in Buffalo, Cleveland, Detroit and Chicago, on which average the Philadelphia scale is based. In three of those cities a reduction in wages has been declared, thus lowering the average for the four. Adjusting the Philadelphia scale to the new average, it is said, will enable the Rapid Transit Company to save $1,000,000 or more a year. The company's announcement was as follows:

> The co-operative plan for collective bargaining of the Philadelphia Rapid Transit Company provides as a basis for determining wages the average of the wage scale of the street railway companies of Buffalo, Cleveland, Detroit and Chicago.
>
> In conformity with the wage decrease of the Cleveland Railway and the Detroit United Railway to be made effective on May 1, 1921, the general committees under the co-operative plan agree that the scale of wages (in cents per hour) of the trainmen of the Philadelphia Rapid Transit Company to be established effective as of May 1, 1921, should be as follows:

Surface motormen and conductors	60, 63 and 65
Elevated motormen	63, 66 and 68
Elevated conductors	60, 63 and 65
Elevated guards	60, 62 and 63

> In conformity with the decreases made in Cleveland and Detroit, effective on Jan. 1, 1921, and in Buffalo to be made effective on May 1, 1921, the wage scale of the regular employees of way department track forces, namely: track laborers, trackmen, pavers, rammers, switch cleaners and drivers, should be reduced 14½ cents an hour, effective May 1, 1921.
>
> In conformity with the wage decrease of the Cleveland Railway and the Detroit United Railway the wage rates of other employees who received the increase of 7½ cents an hour, or $15 a month, effective on June 1, 1920, and those employees who have been engaged at wage rates including the June 1, 1920, increase, should be decreased 7½ cents an hour or $15 a month, effective on May 1, 1921.

Wage Cut Rejected in Salt Lake

Platform, shop and track employees of the Utah Light & Traction Company, Salt Lake City, Utah, have voted unanimously to reject the proposal of the company to reduce wages, ranging from 14 to 20 per cent. All other conditions of the proposed new working agreement, to run from May 1, 1921, to May 1, 1922, have been accepted by the employees. Arbitration of the wage section of the new agreement has been asked by the employees. H. F. Dicke, general manager of the company, states, however, that the question of arbitration will have to be passed on by the directors of the company. It is claimed by Mr. Dicke that the arbitration clause in the present contract provides for arbitration of questions concerning the present contract, and does not cover negotiations in regard to a new contract.

The present shop scale is from 50 cents to 68 cents an hour. It was proposed to cut this scale approximately 20 per cent, making it from 40 cents to 56 cents an hour.

At the present time the trackmen are receiving a maximum wage of $5.25 and a minimum of $4.50 for a nine-hour day. The company proposes a maximum of $4.20 and a minimum of $3.60 for the same length of workday.

Platform men are receiving at the present time a maximum of 64 cents an hour for a nine-hour day. It is proposed to reduce this maximum to 55 cents an hour. The minimum pay of trainmen is 57 cents an hour. This it was proposed to cut to 48 cents an hour. The reductions here are approximately 14 per cent. The proposed minimum of 48 cents an hour would prevail only for first-year platform men, their wage thereafter to be 55 cents an hour.

New Utility Bill Submitted in Illinois

Plans for a radical change in the Illinois public utilities law will probably come to a head in the Legislature of that State in the near future. This is in accord with the campaign pledges made by Governor Small. A draft of the new bill has been submitted and while it is subject to change it is expected to be approved with the important features retained.

Summarized, this bill provides for a repeal of the present public utilities act and abolition of the present commission. It also provides that in case a contract is entered into between a city and a public utility concerning rates or service, this cannot be abrogated except by a majority vote of the people in the city affected. The people of any community would also be permitted to adopt home rule through its council or any governmental commission. Likewise, home rule may be abandoned by majority vote of the people. Any public utilities which are not within a municipality and all public utilities in municipalities which do not adopt home rule are to be placed under the jurisdiction of the Illinois Commerce Commission. This commission would consist of seven members to be appointed by the Governor for terms of four years. There would also be eight assistant commissioners to hold hearings or make investigations. Appeals from the commerce commission would be taken to the Circuit Court of the county in which the case arises.

The Governor has been working in harmony with the Chicago city administration which is endeavoring to form a transportation district with electric railway service based on a 5-cent fare and taxation to make up any deficit which may occur.

Fifteen Cent Reduction

Final Proposition Made by Manager Blinn at Akron—Arbitration Likely

In referring further to a discussion which took place on April 14 between representatives of the Amalgamated and officers of the Northern Ohio Traction & Light Company, Akron, Ohio, in regard to wages to be paid trainmen beginning May 1, A. C. Blinn, vice-president and general manager of the company, said in a communication to the men dated April 22 that the question of wages must be determined not only by the cost of living, but by the company's financial condition. He said that it was his understanding that the proposal made on April 14 had been rejected. A marked reduction from the present wage scale was absolutely necessary. He submitted as final:

1. A straight reduction of 15 cents an hour from the present scale.
2. Submission of the entire question of wages to arbitration if the proposed wage scale was not accepted.

Under the reduction suggested the wages in cents per hour would be as follows:

	City Lines	Suburban Lines	Interurban Lines
First year	44	45	50
Second year	47	48	52
Thereafter	50	51	55
Brakeman	50	50	50

Three cents per hour additional over the city scale would be paid for the operation of one-man city cars:

Mr. Blinn further explained that in case the first proposition was accepted the following working condition should prevail:

> The company reserves the right to make and change all schedules; said schedules to provide for necessary lay over.
>
> All runs on working schedule shall conform to a ten-hour work day as near as possible.
>
> All runs on working schedule to be not less than eight hours. Working schedule shall not include tripper runs.
>
> Motormen, conductors or brakemen working runs of eight hours or more who are called to work extra shall be paid time allowed plus one hour.
>
> Any motorman, conductor or brakeman assigned for work at a specified time, and if for any reason, not their own, do not start to work at the time specified, shall be paid for the time elapsing between the time they reported and the time they actually started work in addition to time worked.
>
> Any motorman, conductor or brakeman assigned for work at a specified time and on account of the weather or for other reasons, not their own, do not do any work, shall be allowed one hour time for reporting.
>
> Motorman and conductor who properly make out accident report or reports, at the completion of their day's work and same is O.K.d by dispatcher on duty will be paid for one hour's time.

Mr. Blinn further said that in the event the second proposition was accepted the working conditions previously noted should likewise be subject to arbitration, the board of arbitration to settle the question by May 20.

The men rejected the company's arbitration proposal on Tuesday night and threatened an outlaw strike. P. J. Shea, international officer, declared the charter would be taken from the local organization if the men walked out on Thursday as threatened.

$32,000,000 Terminal Improvement

Electric Interurban and Steam Lines at Los Angeles Ordered to Start Work at Once on New Union Depot

The Railroad Commission of California has ordered the Southern Pacific, Santa Fe, Los Angeles and Salt Lake Railroad Companies and the Pacific Electric Railway at Los Angeles to proceed with the construction of a union passenger station on the Plaza site. Construction of the station, as set forth by the commission, is considered as the first step in a comprehensive plan of transportation development in Los Angeles, embracing the gradual elimination of all the important grade crossings in the city.

THE commission orders that the railroad lines, affected by the order, must name a joint committee in thirty days, while plans for the union depot must be filed within six months. In the event that the committee is unable to agree upon a chairman, this official will be selected by the Railroad Commission.

The commission states that the Pacific Electric's most urgent service and traffic problems dealing with the Hill Street and Hollywood situation are not affected by the present proceedings and nothing contained in same will prevent or need delay a partial or complete solution of these difficulties. Both the Pacific Electric and the Los Angeles Railway, said the commission, will have to make provision for adequate local street railway service to and from the new union passenger depot which is proposed.

In concluding its reference to the terminal controversy, the commission said that, in selecting the Plaza site, it "assumes that the city will carry out its repeatedly announced intention to further in every possible way the consummation of the general plan, which by resolution the city authorities have so strongly urged the commission to promulgate in these proceedings."

The commission indicated that it was not practicable at this time to deal extensively with the matter of cost and division of expenditure, and that these features would be reserved for a subsequent decision. The cost of the Union Station would be much less than that of the entire plan, the commission stated, and the figure would be made known after the plans of the engineering committee have been filed with the commission. The commission declared it was not contemplating an unreasonably large expenditure, and that the Southern Pacific and Salt Lake Roads, and the Pacific Electric Railway contemplated the expenditure of approximately $17,000,000 for incomplete development.

The campaign for a union terminal in Los Angeles began in the year 1911, following a series of grade crossing accidents in the city and county, and the Railroad Commission was petitioned to order the elimination of grade crossings. Fearing that it lacked full authority to cope with the situation, the commission ruled against itself to get the opinion of a higher court. When an appeal was made to the State Supreme Court the commission was informed that it had full authority in the premises and that it should lose no time in satisfying its petitioners.

Richard Sachse, chief engineer of the commission, was placed in charge of the work, and with his staff of engineers spent two years in preparing a study and survey of the traffic conditions in the city of Los Angeles. This survey covered more than 1,000 pages when it was finally completed.

At the time Mr. Sachse reported on this union terminal to be located at the Plaza, in accordance with his recommendations, it was stated by him that the completed improvements could be had for $32,233,445. His report figured grade crossing elimination along the Los Angeles River at $4,596,000; carrying this work through to Pasadena, $6,700,000; Butte Street trackage, $192,000; union passenger terminal and yards, $10,933,000; union freight station, $2,575,000; new freight yards, $2,835,000; doubling tracking from Los Angeles to Colton, $136,000 (S. P. Lines); team yards, $629,000; additional trackage, $710,000; subway and elevated work, $5,741,000; release of sites, $2,800,000.

Throughout the proceedings, all three of the steam roads and the Pacific Electric Railway opposed the union passenger terminal proposed. It is apparent that the railroads intend to appeal to the courts before they submit to the commission's orders—that the matter will first be carried to the Interstate Commerce Commission, then to the highest courts of the United States, if necessary, in order to obtain relief from what the railroads term a drastic order of the commission.

Tacoma Company Cannot Proceed with Extensions Now

At a public meeting held in Tacoma, Wash., recently, attended by members of the City Council, officers of the state department of public works, and officials of the Tacoma Railway & Power Company, 300 residents of the so-called Jefferson Square District, lying between Sixth Avenue and the Point Defiance car line, presented their urgent need of extensions to street car service, and received assurances of the city and state officials that the matter would be thoroughly investigated.

E. V. Kuykendall, state director of public works, stated that the state engineering department would take any action found necessary by the investigation. Tacoma Railway & Power Company officials present explained that the company had been unable to extend the line because its returns were insufficient.

N. L. Robbins, statistician of the company, presented figures to show that the cost of operating one extension of the line would be $51 a day, with estimated income of $20.36. He pointed out that since 1918 the company has been trying by various means, such as bus and stage lines, to cover this district, all efforts being financially unsuccessful. Richard T. Sullivan, manager of the company, stated that during the year 1919 the company lost $103,000 in operating its lines in Tacoma and that while the present outlook was more hopeful the company could not be burdened with any further expenditures until returns had begun to show an increase. He expressed his willingness to co-operate in any way to secure the extensions.

Strike Narrowly Averted

Walkout of Detroit United Employees Put Off for Week Pending Resubmission of Pay Cut

After employees of the Detroit United Railway had voted eight to one in favor of suspension of work and the City Council had met with the Mayor to consider the situation a conference between the company officials and the representatives of the four unions resulted in a truce which averted for at least one week the threatened tieup.

At the conference the day before the company's proposed reduction of 20 per cent to 28 per cent in its platform men's wages was to go into effect an agreement was reached whereby the company agreed to postpone for one week the posting of bulletins announcing the wage reduction. In event the men accept the company's proposal at the end of the week the reduced rate will be retroactive from May 1.

After a conference the president of the Amalgamated Association and company officials expressed the belief that the questions voted on by the men had not been thoroughly understood when they voted to reject the proposition submitted to them and empowered the joint committee to call a strike. The propositions on which the men voted are:

1. Do you favor acceptance of the company's proposed working agreement based upon the Cleveland agreement calling for a wage scale of 55, 58 and 60 cents an hour?
2. Do you favor submitting the entire question of wages, hours and working conditions to a board of arbitrators?
3. Do you authorize a suspension of work, if necessary?

According to a report on the ballot, 273 of the union members voting favored the first plan, 154 were in favor of arbitration according to proposition number 2, and 3,321 voted to authorize a walkout.

The vote Saturday is the outcome of negotiations carried on by the company and the men since the company announced its proposed wage cut from 70, 73 and 75 cents an hour to 50, 55, and 60 cents an hour, effective on May 1.

The unions voted unanimously to reject the cut and offered to arbitrate the question of wage reduction only. The company in turn insisted that any arbitration must include the entire working agreement between the company and the unions. No agreement being reached the company offered a new plan based upon the Cleveland wage scale of 55, 58 and 60 cents per hour.

Announcement by Mayor Couzens that the street railway commission would reduce the wages of employees of municipal lines from 70, 73 and 75 cents an hour to 55, 58 and 60 cents an hour was followed by a vote of the city employees to follow the union lead.

It will be explained to the men that the offers made by the company are the only conditions that can be secured without a strike. With this in view the representatives of the union asked the company to withhold the bulletins for seven days and leave the proposition that they had submitted stand for the men to consider and ballot on again. To this the company agreed.

Elevated Men Accept Cut

New Agreement between Trustees and Amalgamated Involves Reductions to Take Effect in Installments

The trustees of the Boston (Mass.) Elevated Railway have entered into a new agreement with their employees who are members of the Amalgamated Association, involving wage reductions of from 7 to 10 per cent, effective during the twelve months beginning July 1. For blue uniform men who have reached the senior grade of pay—after one year's service—the reduction is to be 7 per cent, divided into two parts, approximately half the reduction being applied July 1, and the balance Jan. 1, 1922. For the balance of the employees under the Amalgamated agreements the straight reduction of 10 per cent will be effective July 1.

As practically all the blue uniform men now employed are of the senior grade, the company will only save about 3 per cent on trainmen's wages during the first six months of the new agreement. It is estimated that the total savings to the company, under this new agreement will be approximately $1,000,000 during the twelve months. The total wages for 1920 were $17,216,445.

A considerable number of employees who are working under agreements of the various skilled crafts unions are not affected by this new wage scale, but as their various agreements expire it is not unlikely that they may be renewed with moderate reductions in wages to conform to labor market conditions in Boston.

The negotiations attendent upon the formation of this new agreement were unique because of their brevity and harmonious character. After brief preliminaries between the officials representing the company and the men, the wage proposals were submitted to vote of the union membership and accepted without dissent in less than two days.

The old agreement expires, as far as wage scale is concerned, July 1, and sixty days' notice is required of either party of any desire to change any portion of the agreement.

The wage scale (in cents per hour) for blue uniform men as at present and as agreed for the next year follows:

SURFACE TRAINMEN

	Present	July 1 to Jan. 1	Jan. 1 to July 1
Minimum (3 months)...	58	52	52
Intermediate (9 months)	64	58	58
Maximum (thereafter)..	70	68	65

Operators of one-man cars are to receive a differential of 10 cents an hour, instead of 15 cents as at present.

It is expected that other than the wage scale, the old agreement will be renewed without any important changes in working conditions. Minor matters are now being negotiated. The 8-hour day with 60 per cent of all runs coming inside an 11-hour spread is in effect. The trustees issued the following statement to the men as indicative of their policy:

MOTORMEN—RAPID TRANSIT TRAINS

	Present	July 1 to Jan. 1	Jan. 1 to July 1
Minimum (3 months)...	65	61	61
Intermediate (9 months)	66	62	62
Maximum (thereafter)..	72	70	67

GUARDS—RAPID TRANSIT TRAINS

	Present	July 1 to Jan. 1	Jan. 1 to July 1
Minimum (3 months)...	62	56	56
Intermediate (9 months)	63	57	57
Maximum (thereafter)..	65	63	60

> In reaching this conclusion the trustees have given consideration and weight:
>
> 1. To the fact that although a substantial decrease has already taken place in many items affecting the cost of living that cost is not yet upon any settled basis so that it is peculiarly a fitting time to put in practice the belief of the trustees that to be consistent they should be as deliberate and conservative in following the cost of living when it is upon a downward trend as in following it when it is in an upward movement.
>
> 2. To the fact that the trustees thoroughly appreciate the co-operation that the men have given to the management during the past year which has made possible what would otherwise be impossible in the saving of expenditures amounting to large economies; in other words the existence of the spirit which has financial as well as other value in the conduct of this service.
>
> 3. The fact that as public officials they are in charge of a public business entirely disconnected from any private or competitive industries and that in this attitude they should be careful not to adopt as a standard for the payment of compensation any other rule than that of a full fair wage for work that is earnestly performed.

Wages Reduced in Lexington.—Wages of motormen and conductors employed by the Kentucky Traction & Terminal Company Lexington, Ky., have been reduced 5½ cents an hour. The reduction was made through agreement between A. A. Babblitz, Lexington, arbitrator for the men, and George MacLeod, Versailles, arbitrator for the company. The negotiations were based, it was stated, upon an agreement between the men and the company which provided for changes in the wage scales in accordance with cost of living increases and decreases as reported by U. S. Department of Labor. The minimum wage under the new agreement is 38½ cents an hour and maximum 41½ cents.

Strike Averted

Eastern Massachusetts Company and Employees Agree to Arbitrate Wages and Other Details

Through concessions made at practically the last moment by both the company and the employees, the expected strike on the lines of the Eastern Massachusetts Street Railway failed to materialize on May 2 as anticipated. The important question of the handling of discipline cases was settled in conference, and with this point finally agreed upon, both sides consented to leave the question of wages and other details to the Massachusetts State Board of Conciliation and Arbitration. The company withdrew its demand for settlement on the open shop basis, in view of the agreement on the discipline question.

A three-cornered agreement has been made between the company, the employees and the State Board, looking toward a prompt hearing and settlement of the entire problem. James H. Vahey, the attorney for the Amalgamated Association, is to take not more than two days to present the case of the employees, the company is to have the next two days, and the State Board in turn has agreed to render its decision on or before Saturday, May 14. Many of the minor points of the new agreement were settled in conferences.

The handling of discipline and discharge cases was the stumbling block which kept both sides from getting together sooner. Under the old agreement, the trustees found themselves embarrassed in maintaining discipline, due to the fact that any man discharged by the company could go before his local union, demand arbitration and secure it on a favorable oral vote. In its practical application, this meant that the management had before it the likelihood, if not certainty, of arbitration in every discipline case.

In the new agreement, a man who is discharged will have the right of appeal to the assistant general manager. If dissatisfied with his decision, he may appeal to the labor committee, consisting of four members named by the vice-president, the assistant general manager, the general counsel and one of the trustees. Failing to be satisfied with their decision he may go before his local union and request arbitration. If his union sustains him, by ballot, his case is first to be reviewed by Trustee Wadleigh and Attorney Vahey, who will make a report on it. If they report against the man or disagree, another referendum vote of the local union is required before the actual arbitration proceedings are undertaken.

This procedure is designed to permit of the most thorough review before resorting to the expense of an arbitration.

It was not until this point was settled on the above described basis, on Saturday, April 30, that both sides agreed to leave the wage scale and other contested questions to the State Board of Arbitration.

Franklin Medal to Frank J. Sprague

The Franklin Institute of the State of Pennsylvania will hold a meeting on May 18 for which an interesting program has been arranged. A certificate of honorary membership will be presented to John J. Pershing, General of the United States Army. M. Jusserand, the French Ambassador, will be presented with the Franklin Medal and certificate of honorary membership on behalf of his government for Professor Charles Fabry, University of Paris. Frank J. Sprague will also be honored with the Franklin Medal and certificate of honorary membership. After other honors have been conferred papers will be read. "Studies in the Field of Light Radiation," prepared by Charles Fabry, D.Sc., will be read by Joseph S. Ames, Ph.D., the Johns Hopkins University, Baltimore, Md., followed by "Electric Traction—A Review," by Frank J. Sprague.

News Notes

Accept Wage Cut.—Employees of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., have decided to accept the 25 per cent wage reduction pending settlement by a board of arbitration. The possibility of a strike is now averted. Conferences will continue between the railway and men and an agreement may be reached before arbitration proceedings are started.

Bus Company Makes Improvements.—The Central Auto Stage Terminal, a company organized by twenty-one motor stage lines operating eighty stages out of Seattle, is remodeling a two-story masonry building at Western Avenue, Madison, Post and Marion Streets, from which approximately 5,000 passengers will be discharged and loaded daily. The company is expending $20,000 in improvements to the structure.

Arbitration in Syracuse.—It has been announced that arbitration will be resorted to in the wage dispute on the Rochester & Syracuse Electric Railroad, Syracuse, N. Y. T. C. Cherry, vice-president of the road, and union officials have agreed on the manner of selecting arbiters and names will be announced soon. The wage adjustment will be similar to that under which the New York State Railways' wage dispute is being settled.

More Employees Accept Cut.—Conductors and motormen of the Bay City division of the Saginaw-Bay City Street Railway voted to accept a reduction of 10 cents an hour in their pay from May 1. The action was voluntary on the part of the men, who said they realized that the jitney bus competition, practically unregulated by the city, had so reduced the revenues of the company that they could no longer pay rates under which they had a working agreement.

Arbitration in Des Moines.—The Des Moines City Railway has appointed B. F. Elbert as its representative on the arbitration board which will decide the wages of its trainmen for the coming year. The railway men's union has its representative also in line and it is expected that a third arbitrator will not be needed. This will be the seventh arbitration committee which has been formed since 1905 to settle disputes between the railway and its men. The employees recently rejected the company's wage offer which placed the maximum wage at 60 cents.

Court Hears Attack on Commission.—Justice McAvoy in the special term of the Supreme Court on April 27 heard argument made by Hiram W. Johnson, as special counsel for the city of New York, to restrain George McAneny, Major-General John F. O'Ryan and Le Roy T. Harkness, from acting as transit commissioners in New York City. Mr. Johnson also seeks an order restraining the newly appointed commissioners from taking over the books, papers, etc. Decision in the matter was reserved. Justice McAvoy allowed the attorneys five days in which to submit briefs.

Programs of Meetings

American Society of Mechanical Engineers

The Western Society of Engineers is co-operating with the Chicago committee in the preparation of a program to be presented at the spring meeting of the American Society of Mechanical Engineers at Chicago, May 23-26. This session will be devoted to a consideration of the problems of Chicago as the Rail-Water Gateway of the Middle-West.

This revelation of the magnitude and complications of one of the world's greatest railroad centers will be of vital importance. The program will be supplemented by an address on the Development of the St. Lawrence Waterway. The titles of the addresses follow:

"The Relation of Steam Roads to Rapid Transit Development," by Bion J. Arnold.

"The Function of the Terminal Survey," by J. R. Bibbins.

"Some Aspects of the Problem of Chicago as the Mid-Interior Rail-Water Gateway," by J. R. Bibbins.

"Freight Tunnel System as a Terminal Distribution Agency," by J. R. Bibbins and E. J. Noonan.

"Development of Air Rights in Connection with City Freight Houses," by E. J. Noonan.

"Freight Movement by Motor Trucks, View Point of Carrier and Public," by Hugh E. Young.

Well developed programs will be presented by the Professional Divisions of the Society devoted to forest products, fuels, machine shop, management, material handling, power, railroad, and a specially important session will be devoted to Training for Industries.

H. B. Reynolds of the Interborough Rapid Transit Company, will present the results of a series of tests on a 30,000 kw. General Electric steam turbine installed at the Fifty-ninth Street power house of the Interborough Rapid Transit Company, New York.

Southwestern Electrical & Gas Association

At the opening session of the seventeenth annual convention of the Southwestern Electrical & Gas Association at Galveston, Tex., on May 18 the president's address and report of the secretary will be heard. On May 19 at the first session of the Street & Interurban Railway Section "problems of the minute" in electric transportation will be discussed. On the afternoon of May 19 the first general session will be held at which speakers of prominence in the utility and scientific field will make addresses and answer inquiries. Among these will be Martin Insull, "The Public's Business," J. H. Gill, "The Utility Association as a Permanently Profitable Investment." At the second meeting of the Street & Interurban Railway Section the usual "Round-the-Table" session will be held. This informal "get-together" method where no technical papers are read but where the members discuss freely the status of the electric railways covered by this association (Texas and Louisiana) has proved very successful. At the second "general" session W. G. Busby, chairman, Mo. Public Service Commission, will read a paper, "State Utility Commissioners." There will also be two addresses on "Hometown Financing of Local Utilities," by those who have had recent practical experience in this matter and an address—from the banking side—on the same subject by a Texas banker.

International Street & Interurban Rail-International Street & Interurban Railway Congress

A meeting has been called to begin May 29 and end June 3, 1921, in Vienna of the International Strassenbahn und Kleinbahnverein, recently organized in Nuremberg. Papers are scheduled on the following topics:

(1) Roller bearings in street railway operation, (2) economic condition of steam railroads, (3) relation between cars and tracks, (4) outlook for the light railway, (5) co-ordination of traffic facilities in large German cities, (6) standardization and maintenance, (7) the Copenhagen street railway, (8) technical difficulties in operating a railway in Amsterdam, (9) car construction, (10) ball bearings for trolley cars, (11) psychological tests for employees, (12) proposed electric line in Christiania, Norway, (13) fares and headways and their effect on receipts; (14) high-tension direct-current railways; (15) mercury-arc rectifiers and automatic substations, (16) trackless trolleys, (17) one-man car operation.

The secretary of the association is Dr. Arthur Ertel, Favoritenstrasse 9, Vienna. The president of the association is Ludwig Spängler, general manager, Vienna Municipal Tramways.

Financial and Corporate

Twin City Earnings

Company Is Able to Increase Dividends Nearly 7 per Cent Gain in Traffic

The annual report of the Twin City Rapid Transit Company, Minneapolis, Minn., for the year 1920 indicates an improved financial condition over 1919. The net earnings of the company for the year were sufficient to declare a 3 per cent dividend on the common stock, in addition to the regular dividend on the 7 per cent preferred stock.

The accompanying tables give in detail the income account for the year in comparison with the year 1919. The percentage change is also shown. Details of the traffic handled and other miscellaneous statistical information are given in another table.

During the year the basic fare in both St. Paul and Minneapolis was raised to 6 cents. This rate became effective in Minneapolis on Aug. 16 and in St. Paul on Sept. 13. These increases in fare were made necessary by a substantial increase in wages to the men on the cars. A substantial increase in service was also made to meet the demands of the cities in return for the right to change the basic rate of fare. Practically 1917 schedules are now in operation. The results for the year, so far as traffic was concerned, were better in Minneapolis than in St. Paul.

The physical condition of the property is being improved as rapidly as the finances of the property will permit, and it is anticipated that the property will soon be restored to as good a physical condition as existed prior to the war. Cars are being remodeled to provide front exits, for which there is a public demand. Other cars are being rebuilt for trailer operation to facilitate handling rush-hour traffic more economically than with single-car operation. During 1920 nearly 13 miles of track in the downtown districts were laid in enlarging the loop facilities. The expenditure for these extensions has been justified by the company being better able to reduce congestion during the rush hours.

During the year ten-year gold notes were issued by the subsidiary companies, namely, the Minneapolis Street Railway, the St. Paul City Railway and the Minneapolis & St. Paul Suburban Railroad, as evidence of their indebtedness to the holding company, the Twin City Rapid Transit Company. These notes total $9,850,000 and are to be held in the treasury of the Twin City Rapid Transit Company until such time as the condition of the money market and the earning power of the subsidiary companies warrant their being offered to the public for general investment.

INCOME STATEMENT — TWIN CITY RAPID TRANSIT COMPANY

Year Ended Dec. 31	1920	1919	Percentage Change
Revenue from transportation	$12,879,281	$11,351,739	13.5
Revenue from other railway operations	107,125	90,705	18.1
Total railway operating revenue	$12,986,406	$11,442,444	13.5
Way and structures	1,234,266	1,102,568	11.9
Equipment	1,475,076	1,245,070	18.5
Power	1,185,182	1,175,293	0.8
Conducting transportation	4,652,777	3,788,711	22.8
Traffic	43,561	62,450	*30.2*
General and miscellaneous	1,229,237	1,090,668	12.7
Transportation for investment-credit	*25,266*	19,702	*28.2*
Total railway operating expenses	$9,794,834	$8,445,059	16.0
Net operating revenue	$3,191,572	$2,997,385	6.5
Taxes assignable to railway operation	1,161,507	1,126,338	3.1
Operating income	$2,030,065	$1,871,047	8.5
Non-operating income	84,332	51,034	65.3
Gross income	$2,114,397	$1,922,081	10.0
Rent from leased roads	3,000	3,000	....
Interest from funded debt	1,080,684	1,087,446	*0.6*
Net loss miscellaneous physical property	21,264	32,829	*35.2*
Miscellaneous debits	10,349	10,454	*1.0*
Total deductions from gross income	$1,115,297	$1,133,729	*1.6*
Net corporate income transferred to profit and loss	$999,100	$788,352	26.8

STATISTICAL INFORMATION—TWIN CITY RAPID TRANSIT COMPANY

Year Ended Dec. 31	1920	1919	Percentage Change
Total miles, first main track	249.79	243.07	2.9
Total miles, second main track	184.82	177.40	4.2
Total single-track miles (all tracks)	466.86	452.65	3.1
Average total trackage operated per year (miles)	454.17	451.70	0.5
Revenue passengers carried	238,388,782	222,186,823	7.3
Transfer passengers	77,531,776	73,458,262	5.5
Total passengers carried	315,920,558	295,645,085	6.9
Gross passenger revenue	$12,792,277	$11,179,535	14.4
Gross passenger revenue per mile of line (average for year)	$53,969	$47,303	14.1
Gross passenger revenue per mile single track	$28,166	$24,750	13.8
Average fare:			
Per revenue passenger (cents)	5.37	5.04	6.6
Per total passenger (cents)	4.05	3.78	7.1
Operating ratio (per cent)	75.40	73.70	(*b*) 1.70
Taxes (per cent of gross revenue)	8.90	8.90	(*b*) 0.74
Dividends paid:			
7 per cent on preferred stock	$210,000	$210,000	....
On common stock (*a*)	$660,000	$550,000	20.0

(*a*) 3 per cent in 1920. 2.5 per cent in 1919. (*b*) Difference in points. Italics indicate decrease.

Return of Trolleys to Steam Road Urged

Return of the stock of the Connecticut Company, now held by federal trustees, to the New York, New Haven & Hartford Railroad, its former owners, was urged by Vice-President Edward G. Buckland of the railroad at a hearing on a resolution containing such provisions on April 27 before the committee on railroads of the Connecticut Legislature.

Mr. Buckland said that the electric railway company's lines would continue to be operated "if they could be made to pay"; and stated that the future of the lines, so far as their operation was concerned, would not be affected one way or the other by the proposed transfer of the stock.

A history of the trusteeship was briefly outlined by Mr. Buckland. He told of the action initiated against the New Haven railroad in 1908 for alleged violation of the Sherman anti-trust law; of how the suit was dropped during the Taft administration and renewed under Wilson in 1914. The "New Haven" road then agreed to the separation of the Connecticut Company because it did not wish to jeopardize certain pending financing. Mr. Buckland read an extract from a report by Howard Elliott, then president of the road, to the stockholders in which he pointed out that the road consented to the separation only under financial pressure.

Richard T. Higgins, chairman of the Public Utilities Commission, said he believed that a public utility operating only within the state should be under the supervision of a state body and not of the federal government, adding that the stockholders who were most interested in the prosperity of the lines should be vested with responsibility and control.

George D. Watrous, New Haven, counsel for the trustees, said that the trustees did not think it necessary to appear before the committee but he gave assurance that most of them would carry out an order to release the Connecticut Company's stock.

While Mr. Watrous and Mr. Higgins were disagreeing as to the possibility of the trustees disposing of the company's physical property, Mr. Buckland interposed the suggestion that a sale of the stock might result in the acquistion of the company's property by interests "even more undesirable than the New Haven Railroad."

Canadian Road Does Well

Ten Per Cent Increase in Net Revenue Allows British Columbia Electric Railway to Pay Dividends

The annual report of the British Columbia Electric Railway, Ltd., Vancouver, B. C., for the year ended June 20, 1920, recently issued, reflects the prosperous financial condition of the country for that period. As a result of the increased population and trade expansion, the revenues of the company increased so that the annual gross receipts were the largest in the history of the company. Despite the heavy increases in the cost of operation and a proper allowance for depreciation, it was possible to declare reasonable dividends free of income taxes.

The growth of population has necessitated a substantial expenditure of capital during the past year. Past financial management has enabled the company to meet this expansion without having to issue additional securities. It was possible only because the debentures are irredeemable and consequently a considerable part of the provision for co-depreciation has accumulated in cash and is now being utilized for necessary extensions and developments. Had the debentures been redeemable, much of the provision made for depreciation would have been absorbed by the reduction funds, and it would have been necessary to ask for additional capital to meet the extensions in the community served.

Existing fares, the company says, were granted to enable it to meet the increased cost of operation, including higher wages. It is still necessary for the continuance of railway operation on an efficient basis that there should be some authority to whom appeal can be made to sustain or increase if necessary rates and fares in view of the abolition of the Public Utilities Commission.

The net income transferred to profit and loss from operation and other sources during the year amounted to £590,971 as compared with £530,327 the previous year. Adding the balance of the previous year gives a total revenue of £418,585 as against £369,105 in 1919.

STATEMENT OF INCOME—BRITISH COLUMBIA ELECTRIC RAILWAY, LIMITED

Year Ended June 30—	1920	1919	Per Cent Change
Net revenue, including profit on exchange and less depreciation in securities	£609,045	£530,182	14.8
Registration fees, etc	318	145	119.3
Total revenue	£609,362	£530,327	14.9
Charges against revenue during the year			
Depreciation, sinking fund and renewals	£164,745	£154,727	6.5
Office rent, salaries, printing, legal, audit and agency expense	18,413	9,898	86.1
Trustees' fees	877	864	1.5
Corporation profits tax	13,000	....	....
Capital amortization fund	....	1,818	....
Total charges	£197,035	£167,307	17.7
Net revenue for the year from all sources	412,327	363,020	13.6
Add revenue from previous year	6,258	6,085	2.9
Gross income	£418,585	£369,105	13.4
Deductions—			
Interest and debentures and debenture stock	132,339	132,447	— 0.08
Dividend (5%) on perpetual preference stock	72,000	72,000	....
Interim dividend on preferred ordinary stock with income tax thereon	65,032	36,000	80.5
Dividend on deferred ordinary stock with income tax thereon	£115,200	£86,400	33.4
Dividend on preferred ordinary stock with income tax thereon	21,368	36,000	— 40.6
Total deductions	£405,939	£251,058	61.7
Balance to carry forward	£12,646	£6,258	101.9

TRAFFIC STATISTICS—BRITISH COLUMBIA ELECTRIC RAILWAY, LIMITED

	1920	1919	Per Cent Change
Passengers carried	66,411,030	53,326,288	24.5
Tons of freight carried	430,931	331,794	30.0
Freight cars interchanged with steam railroads	9,861	7,463	32.1
Light and power customers added	3,981	....	....
Kilowatt-hours of energy sold	116,196,981	94,953,424	22.4
Cu.ft. of gas sold	545,191,200	431,093,000	26.5

$466,159 Profit for Interurban

The annual report of the Utah-Idaho Central Railroad, Salt Lake City, Utah, shows a net profit of $466,159 for the year 1920. This is $199,277 less than the 1919 figure. The company operates 117 miles of road.

The report shows total operating revenue of $1,056,001 and total operating expenses of $690,815. The operating revenue was $60,871 more than received in 1919, and the operating expense was $26,259 less than it was the year before.

The total investment is $5,221,900. The total amount of stock issued was $1,426,640. The funded debt outstanding at the close of the year was $3,735,000.

During the year the road carried 1,036,727 passengers. Three passengers, twenty-five employees, and one other person were injured during the year and one employee was killed. The 371 persons employed during the year received $409,788 in wages.

Monongahela Valley Succeeds

6 Per Cent Paid on Preferred Stock and More Than $1,000,000 Put Into Property

According to the annual report of the Monongahela Valley Traction Company, the year ended Dec. 30, 1920, was considered to have been a reasonably successful one. The company formerly was engaged solely in the transportation service, but at the present time the railway revenues, amounting to approximately $2,610,000, are only 44 per cent of the total; electric power sales produce 13.4 per cent, while gas production and coal mining operations provide the balance.

Eight one-man safety cars were purchased and installed in Clarksburg, W. Va., during the year. These cars cost $50,000, or about $6,250 each.

In the latter half of 1920 the company, according to the report, did not have sufficient railway equipment to carry all of the passenger traffic offered and this demand can only be met through the purchase of additional equipment and extensions to the railway lines. In view of this situation, the company officials believe that certain rates now charged can be advanced so as to permit the company more nearly to earn a fair return on its investment and thereby enable it to market securities with which to provide capital for necessary betterments and improvements.

Sunbury Line Sold Under Foreclosure

Bondholders of the Sunbury & Susquehanna Railway, Sunbury, Pa., represented by John W. Whitaker, on April 25 bought the property at receivers sale for $55,000. This includes 6 miles of line operating between Sunbury and Selinsgrove and a mile opposite the Pennsylvania Railroad yards North of Northumberland, and known as the Sunbury, Lewisburg & Milton Railway. The property has been in the hands of receivers for eight years.

Brooklyn Earnings Improving

The Brooklyn (N. Y.) City Railroad, formerly included in the system of the Brooklyn Rapid Transit Company, recently issued a statement of income for February, 1921, compared with February, 1920. Income figures covering the period of July, 1920, to February, 1921, also were announced. The earnings reported are shown in the accompanying table.

INCOME ACCOUNT—BROOKLYN CITY RAILROAD

	Feb. 1921	Feb. 1920	July 1, 1920 to Feb. 28, 1921
Passenger revenue	$777,236	$693,780	$6,345,329
Other revenue	27,256	23,452	242,045
Total	$804,492	$717,232	$6,587,374
Operating expenses and taxes	753,459	773,585	7,039,877
Gross income	$50,033	*$56,353*	*$452,503*
Income deductions	58,573	71,560	456,491
Net corporate income	$7,540	*$127,913*	*$908,994*

NOTE:—Italics denote deficit.

Depreciation in San Francisco

Table Showing Full Depreciation Allowances for Municipal Railway and United Railroads

In the last issue of this paper a letter was published from the chief engineer of the city of San Francisco referring to the way in which the depreciation accounts for the Municipal Railway and the United Railroads of that city were treated in one of three tables published on page 697 of the issue of this paper for April 9. While the figures as printed were correct, they may have been misleading to some owing to the difference in practice of the two systems in the way of treating the depreciation account. In the report of the Municipal Railway as given out by the city and as printed in the table, the full amount allowed for depreciation, 14 per cent of the passenger revenue, appears in the operating report. In the report of the United Railroads for the year ended June 30, 1920, $550,000 was charged to the profit and loss account as a depreciation reserve in addition to the sum included in the maintenance accounts. The wording of a footnote in the table as printed may have given the impression that the latter amount was the total amount charged to depreciation.

The accompanying table is a reprint of the table in question except that the sum of $550,000 charged by the United Railroads to its depreciation reserve is now included in the operating account and the percentages and other figures are changed to fit this plan.

In connection with the above analysis of the operations of the Municipal Railways of San Francisco M. M. O'Shaughnessy, chief engineer of the city, has submitted the accompanying figures.

The company, he states, has, besides building two car houses, extended the original 45 miles of track called for in the bond issues by 18 miles, so that at present there are 63 miles of operated trackage exclusive of 4 miles in car houses, sidings, etc.

The following figures do not take into account the comparison charges that are required by the city charter. These charges are about $1,000,000.

COMPARISON OF OPERATIONS—YEAR ENDED JUNE 30, 1920

	United Railroads of San Francisco					Municipal Railway of San Francisco				
	Actual	Per C.-M. Cents	Per C.-H.	Per Cent of Operating Revenue	Per Cent of Operating Expense	Actual	Per C.-M. Cents	Per C.-H.	Per Cent of Operating Revenue	Per Cent of Operating Expense
Passenger revenue	$8,938,987	34.85	$3.08	99.30	......	$2,702,289	36.41	3.399	99.63	.....
Revenue from other railway operations	63,124	.34	.02	0.70	......	10,147	.14	.013	.37	.....
Total operating revenue	$9,002,111	35.19	$3.100	100.0	......	$2,712,436	36.550	3.412	100.00	.....
Way and structures	423,853	1.651	$0.145	4.69	6.08	$102,130	1.374	$0.128	3.76	4.06
Equipment	548,955	2.140	.189	6.09	7.88	186,947	2.520	.235	6.90	7.44
Depreciation	(a) 550,000	2.150	.189	6.11	7.90	378,429	5.099	.476	13.98	15.08
Total maintenance	$1,522,808	5.941	$0.523	16.89	21.86	$667,506	8.993	$0.839	24.64	26.58
Power	1,357,225	5.300	.467	15.05	19.52	348,383	4.700	.438	12.86	13.87
Conducting transportation	3,471,854	13.550	1.194	38.55	49.98	1,293,309	17.420	1.628	47.65	51.40
Traffic	......	......	......	......	......	666	.009	.001	.03	.02
General and miscellaneous	695,874	2.720	0.240	7.72	10.00	202,554	2.730	.254	7.49	8.06
Add general miscellaneous comparison charge	....	......	......	......	.....	4,912	0.066	.006	0.16	0.19
Total general and miscellaneous	$695.874	2.720	$0.240	7.72	10.00	$207.466	2.796	$0.260	7.65	8.25
Credit transportation for investment	*94,463*	*0.368*	*0.032*	*1.05*	*1.36*	....	......	......	......	.....
Total operating expenses	6,953,298	27.150	$2.394	77.29	100.00	$2,517,330	33.918	3.166	92.83	100.00
Net operating revenue	2,048,813	8.040	.706	22.71	29.48	195,106	2.632	.246	7.17	7.76
Taxes	513,200	2.005	.176	5.17	7.37	226,535	3.058	.284	8.36	9.02
Net earnings	1,535,613	6.035	0.530	17.54	22.11	*31,429*	*0.426*	*$0.038*	*1.19*	*1.26*
Revenue miles	25,610,023	......	8.84	......	......	7,419,272	......	9.32	......	.....
Revenue hours	2,906,503	......	......	......	......	795,578	......	......	......	.....

(a) Allowance from profit and loss account for the year. Italics indicate deficit.
The figures shown for way and structures and equipment also include in part some allowance for current depreciation.

FUNDS VOTED BY THE CITY

Bond Issues:		
Geary Street, 4½ per cent bonds, dated July 1, 1910		$1,900,000.00
Market Street, 4½ per cent bonds, dated July 1, 1910		120,000.00
Municipal 5 per cent bonds dated Dec. 1, 1913		3,500,000.00
Contribution from General Taxes:		
From city and county of San Francisco during the fiscal years 1910 to 1915 inclusive, to meet interest on funded debt	$239,901.83	
Cost of bond election Dec. 30, 1909, and referendum election April 22, 1913	29,628.54	
Provisional charges for legal and clerical services rendered by city employees	37,022.10	306,552.47
		$5,826,552.47

REVENUE RECEIVED

Total revenue received from the railway for eight years ending Dec. 31, 1920	$15,078,490.49
Operating expenditures for same period	9,561,758.63
Net earnings, exclusive of taxes and depreciation	$5,516,731.86

DISTRIBUTION OF NET EARNINGS

Interest on outstanding bonds	$1,642,322.03
Redemption of maturing bonds	899,300.00
Extensions and betterments	1,188,150.20
Depreciation	1,266,832.01
Compensation insurance	156,628.69
Materials and supplies	150,578.72
Advanced to Twin Peaks Tunnel	82,152.57
Accidents, damages, etc	130,767.68
Total	$5,516,731.86

Cleveland Traffic Decreasing

The report of the Cleveland (Ohio) Railway for March showed an ordinance surplus of $41,335, of which $28,234 was a tax refund due to a reduction in the company's valuation ordered by the state tax commission following a lengthy dispute. This ordinance surplus reduced the deficit in the company's interest fund, which is the fare barometer, from $53,425 to $12,090.

During March the company over-expended its maintenance allowance by $19,686, making the total current deficit in the maintenance, depreciation and renewal account $222,361. The over-expenditure for the month of the company in its operating allowance was $30,775, making the total current deficit in the operating account $254,638.

These two deficits have now reached such a considerable sum that company officials say they will soon have to ask City Council for some sort of an adjustment, particularly in view of the fact that the company's maintenance allowance and its operating allowance were each reduced 1 cent a car mile on April 1 under the terms of the ordinance. The need is great for caring for these deficits speedily.

During March the company carried 35,900,733 riders, a decrease in traffic of 7.04 per cent over the same month a year ago. The February traffic decrease was about 4 per cent as compared with the previous year.

Although the company officials and Fielder Sanders, street railway commissioner, took steps to curtail service in proportion to the traffic decrease they could not keep pace with the rapidly declining number of car riders, as the number of car miles run in March was 3,157,360, a decrease of only 9.41 over the same month in 1920. Further curtailments of service, however, have been made during April.

The 20 per cent wage reduction accepted by the company's trainmen, effective on May 1, will result in a saving of approximately 1 cent a car mile.

Twenty per Cent Revenue Increase with Seven-Cent Fare

The income statement of the Philadelphia (Pa.) Rapid Transit Company for the months of February and March, together with the three months' period ended March 31, is shown in the accompanying table. Since the inception of the 7-cent fare in November, 1920, the Philadelphia Rapid Transit Company has realized a 20 per cent increase in revenue with a corresponding decrease in traffic of only 4.1 per cent. In connection with the record of traffic handled it is disclosed that the number of 3-cent exchange tickets sold decreased about 10 per cent and that joint rate passengers from foreign lines increased about 28 per cent. For the five months' period ended March 31, 1920, with the 5-cent fare in effect 12,644,723 more passengers were carried than in the corresponding period with the 7-cent cash fare and the four for a quarter ticket rate.

INCOME STATEMENT PHILADELPHIA RAPID TRANSIT COMPANY

Month Ended	March 1921	March 1920	Per Cent Change	February 1921	February 1920	Per Cent Change
Operating revenue	$3,757,508	$3,179,961	18.2	$3,207,373	$2,698,457	18.8
Operation and taxes	2,765,136	2,234,354	23.8	2,442,504	2,049,795	19.2
Operating income	$992,372	$945,607	4.9	$764,869	$648,662	18.0
Non-operating income	46,637	45,109	3.4	36,996	38,900	*4.9*
Gross income	$1,039,009	$990,716	4.9	$801,865	$687,562	16.7
Fixed charges	820,823	816,476	0.5	818,297	813,585	0.6
Net income or deficit	$218,186	$174,240	25.2	*$16,432*	*$126 023*	87.0

Three months ended March 31:		1921	1920	Per Cent Change
Operating revenue		$10,583,230	$8,921,677	18.7
Operation and taxes		7,878,546	6,499,627	21.2
Operating income		$2,704,684	$2,422,050	11.7
Non-operating income		121,226	123,997	*2.2*
Gross income		$2,825,908	$2,546,047	11.0
Fixed charges		2,461,362	2,446,666	0.6
Net income		$364,546	$99,381	266.5
5% return on P. R. T. paid in capital—Three months to March 31, 1921	$375,000			
Amount by which gross revenues were insufficient to provide for operating expenses, taxes, fixed charges, and the 5% return upon P. R. T. Stock for the year ended Dec. 31, 1920	$1,117,934			
		$1,492,934		
Accumulated deficit for the fifteen-month period to March 31,1921		$1,128,387		

PASSENGER STATISTICS

March	Passengers 1921	Passengers 1920	Per Cent Change	Revenue 1921	Revenue 1920	Per Cent Change
7-cent fares	4,796,271	....	....	$335,738	....	....
6¼-cent tickets	50,658,385	....	....	3,166,149	....	....
5-cent fares	....	58,858,900	....	....	$2,942,944	....
3-cent exchange tickets	4,454,332	4,881,467	*8.8*	133,629	146,444	*8.8*
Joint rate passengers—foreign lines	728,297	667,891	9.1	29,908	21,271	40.5
Transfers	13,083,915	13,184,661	*0.8*	....	....	....
Frees	397,173	460,982	*13.8*	....	....	....
	74,118,373	78,053,901	*5.0*	$3,665,426	$3,110,660	17.8
Five months ended March 31:						
7-cent fares	27,316,031	....	....	$1,912,122	....	....
6¼-cent tickets	241,613,470	....	....	15,100,841	....	....
5-cent fares	....	281,574,224	....	....	$14,078,711	....
3-cent exchange tickets	20,968,808	23,353,740	*10.2*	629,064	700,612	*10.2*
Joint rate passengers—foreign lines	3,876,818	3,010,147	28.8	159,310	95,647	66.5
Transfers	61,952,081	62,778,117	*1.3*	....	....	....
Frees	2,101,834	2,184,412	*3.8*	....	....	....
	357,829,042	372,900,640	*4.1*	$17,801,338	$14,874,970	19.7

PASSENGER EARNINGS

	1920	1919	Per Cent Change
Ten months ended October 31	$30,522,922	$28,564,928	6.8
November	3,656,497	3,003,672	21.7
December	3,786,442	3,129,467	20.9
Total for twelve months	$37,965,861	$34,698,057	9.5
	1921	1920	
January	3,552,152	2,987,814	18.8
February	3,140,821	2,643,357	18.8
March	3,665,427	3,110,660	17.8
Five months ended March 31	$17,801,339	$13,874,970	19.7

Italics show decrease or deficit

Financial News Notes

New Lease Approved.—A lease of the Medway & Dedham Street Railway to the Milford & Uxbridge Street Railway, Milford, Mass., has been authorized by the directors and stockholders, and approved by the Massachusetts Department of Public Utilities.

Assessment Still Under Protest.—The County Board of Equalization at Louisville, Ky., has reduced the tentative assessment of the Louisville Railway's property from its first figure of more than $14,000,000 to $9,000,000 flat. The previous assessment was $4,000,000. The assessment of the Louisville & Interurban Railway was not changed by the State Tax Commission, but remains at the same figure, $1,750,000.

Court Orders Interest Payment.—The United States District Court recently ordered Joseph K. Choate, receiver of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., to pay the coupon on the first 5 per cent bonds of that company, which was due on Oct. 15, 1920, together with interest thereon from that date.

Colorado Road Gives Up the Ghost.—The electric railway property of the Durango Railway & Realty Company, Durango, Col., is being dismantled. The company operated 2.5 miles of standard gage electric railway with five motor passenger cars. It is the first electric street railway in Colorado to give up the ghost.

Merger May Be Made Compulsory.—A bill which will permit the electric railways in Washington, D. C., to effect voluntarily the merging of their lines is being drafted in the District of Columbia committee of the House of Representatives. If prompt action does not follow the enactment of such legislation it is expected that another bill will be reported out promptly which would, in effect, compel the local companies to merge.

Capital Increased $10,000,000.—Papers have been filed with the Secretary of State of West Virginia by the Monongahela Valley Traction Company, Fairmont, certifying to an increase in its capital stock from $10,000,000 to $20,000,000. The same company in filing with the New York Stock Exchange an application to list notes a change in name of the company from the Monongahela Valley Traction Company to the Monongahela Valley Traction & Light Company. It is understood that this change was made in order to indicate more accurately the field of operation of the company, which is engaged in railway operation, electric light and power service, mining coal and kindred activities.

Approval Sought for Purchase Financing.—To carry out its plans for the purchase of the Sacramento Northern Railroad the Western Pacific Railroad has applied to the California Railroad Commission for authority to issue $4,180,000 of its first mortgage 5 per cent gold bonds. The bonds are to be exchanged for bonds of the Sacramento Northern now in the hands of a trustee. The Sacramento Northern bonds deposited for exchange amount to 90.906 per cent of the total issue. The bonds are to be exchanged on the basis of $80 face value in Western Pacific bonds for $100 face value of Sacramento Northern bonds. Of the Sacramento Northern stock issue 90.639 per cent, or $4,065,094, has been deposited with the trustee. The Western Pacific is to pay $27.50 a share for trust certificates representing first preferred stock, $15 for trust certificates representing second preferred stock and $6 for certificates representing common stock.

Traffic and Transportation

New Jersey Case Concluded

Counsel Reserves Right of Appeal—Company Must Have Compensatory Rate

Valuation of the property of the Public Service Railway, Newark, N. J., at $125,000,000 or any other figure will not be considered by the Public Utility Commission in reaching a decision on the company's application for a 10-cent fare. The Utility Board made this announcement on April 22 when the rate hearing was resumed, although it was indicated at first that the valuation figures would be injected into the fare case.

That means the case will be decided along the lines laid down by Thomas N. McCarter, president of the railway; namely, a decision as to whether the company can continue operation on its present fare, regardless of the valuation of property. It is a clear-cut case of determining whether the company's operating expenses justify a 10-cent fare.

On the day that this decision was made the municipalities that would be affected by any increase in fare began the presentation of their side. George L. Record, counsel for Jersey City, introduced as a witness Walter Jackson, Mount Vernon, N. Y. Mr. Jackson testified as to his study of various rates of fare in other large cities, the effect of increases in rates upon gross receipts and upon the riding habit as shown by the index figure. He stressed more particularly the fact that while Boston had gone to a 10-cent fare the Boston Elevated, at least, had tried to increase the usefulness of the system to the public by operating 5-cent short haul lines. He also urged that any fare change that was made should contemplate the sale of tickets at reduced rates as a wise merchandising idea and that different self-sustaining rates of fare should be considered for different traffic districts.

The hearing was resumed on April 27 with Mr. Jackson again the witness.

The Public Service Railway called in rebuttal both Edward Dana, general manager of the Boston Elevated Railway under the public trustees, and W. J. Flickinger, assistant to the president of the Connecticut Company. Mr. Dana testified that the company was getting a reasonable return with a 10-cent fare. From 5 cents the rate with that company went respectively to 7 and 8 cents, but each time, he said, the company knew that it would not be enough return and continued its fight for a 10-cent rate.

At the conclusion of the case Edmund W. Wakelee, counsel for the Public Service Railway, said:

> The Public Service Railway will ask the commission to fix such rate as it approves as a reasonable fare. The company stipulates that it will follow such a rate fixed by the board, at the same time reserving the right to test the validity of whatever rate may be fixed in the higher courts.

Present Fares Held Adequate

The Pennsylvania Public Service Commission refused to approve an increase in the rates of the Warren (Pa.) Street Railway previously established by the commission where it appeared that the applicant had always been in a financial position to pay an annual 6 per cent dividend. The new rate proposed by the company was a 7-cent cash fare, with ten tickets for 65 cents.

Reduced Fares Abolished

Reduced fares at a half-penny per mile with a minimum of a penny, which were applicable under the Tramway Act for persons defined as artisans, mechanics or daily laborers, have been abolished and uniform rates are now charged on all the city tram cars in Glasgow, Scotland. Under the order granted by the Ministry of Transport these rates will be in effect until Feb. 15, 1923, unless previously revoked by the Minister of Transport. Any further increase in fares made before that date will not affect the rates paid by workmen.

The abolition of the lower rates heretofore conceded to workmen was granted on the understanding that the corporation of Glasgow would not grant sums in relief of rates or otherwise to the common good until reasonable provision had been made for the proper repair, maintenance and renewal of the entire railway property.

Zone Fare Works Well in San Diego

Change from 5 Cents to a 10-Cent Zone System with 5-Cent Base Has Produced an Increase of 36.9 per Cent in Revenue

According to an advance copy of the annual report of the San Diego (Cal.) Electric Railway for 1920, furnished through the courtesy of E. J. Burns, "the zone system as operated in the city of San Diego has demonstrated conclusively that it is entirely reliable, free from objectionable complications and has produced very satisfactory financial results. Operations for the first nine months were reviewed in the ELECTRIC RAILWAY JOURNAL for Nov. 13, 1920.

CONTINUING, the report states significantly that:

> The zone system did not disturb real estate values; was not responsible for lowering or raising of rents; and has not changed the population insofar as being directly or indirectly responsible for any congestion in the closely built-up sections of the city, or at the boundary lines of the inner and outer zones. In fact, 90 per cent of the building activities during the year 1920 was confined within the outer zone, and this is also true of contemplated future improvements.

FARE COLLECTION POPULAR AND FASTER THAN BEFORE

It should be understood that the San Diego system is not of the multi-fare collection type, but a true zone system in which but one collection is made for the entire trip. It has been found that the pay-leave plan for outbound traffic and the pay-enter plan for inbound traffic actually has speeded up collection and therefore permitted fewer cars to handle the peak-load traffic than was the case under the old method of operating pay-enter always, especially on cars with limited loading space. The pay-leave plan outbound is pleasing to the public inasmuch as it is not necessary to shift parcels or packages on boarding cars for the purpose of paying fares. As to pay-enter inbound, the only change due to the zone system was the issuing of identification checks which has worked out with no inconvenience or complications.

MORE REVENUE AND MORE RIDERS

The financial success of the zone system is indicated by the operating figures for the year 1920. The revenue received from the transportation of 20,909,587 cash fare and revenue ticket passengers under the zone system amounted to $1,330,275 as compared with an amount of $1,026,445, representing the revenue that would have

TABLE I—CASH FARE AND REVENUE TICKETS, SAN DIEGO ELECTRIC RAILWAY, YEAR ENDED DEC. 31, 1920

(Includes suburban lines)

Passengers Carried	Cash Fare and Revenue Tickets	Rate	Amount
5c. cash fares	7,973,635	5c.	$398,682
10c. cash fares	695,375	10c.	69,538
15c. cash fares	17,696	15c.	2,654
20c. cash fares	9,887	20c.	1,977
25c. cash fares	6,019	25c.	1,505
Total cash fares	8,702,612		$ 474,356
Revenue tickets:			
Four-strip, two-zone ticket	8,139,734	7.5c.	$610,480
$4.00 calendar month book	484,127	7.2c.	37,766
Sixten varieties of school and suburban line tickets	3,583,114	1.66c. to 20c.	$207,673
	12,206,975		$855,919
Grand total	20,909,587		$1,026,445

been received from the same number of passengers based on the rates of fare that existed prior to Jan. 1, 1920, an increase of 29.6 per cent.

The revenue received per passenger under the zone system averaged 6.36 cents, as compared with an average of 4.91 cents based on rates of fare in effect prior to Jan. 1, 1920, making the average revenue per passenger increase 1.45 cents or 29.53 per cent. Table I, in the company's opinion, indicates that the California Railroad Commission was justified when it stated: "The adoption of the zone system is much more likely to secure to the company the necessary additional revenue than a flat increase," stating for its reason that "a large amount of short-haul business would be lost to the company under a flat increase."

Table II further backs up the foresight of the commission, for therein it is shown that the 5-cent fares or short-haul passengers consisted of 38.44 per cent of the total revenue passengers, and that they produced 30.21 per cent of the passenger revenue. Table II also shows that 50.18 per cent of the total passengers were carried on a fare of 1⅞ cents to 5 cents, an average of 4.62 cents per passenger, and that this class of fare produced 36.48 per cent of the revenue. Fares more than 5 cents consisted of 49.82 per cent of the passengers carried, and yielded 63.52 per cent of the total revenue, an average of 8.11 cents per passenger. The total number of revenue passengers carried in 1920 was 20,909,587 compared with 20,538,530 revenue passengers in 1919—an actual increase of 1.8 per cent despite the combination of higher fares and declining activity. Indeed, it is interesting to point out that the figures for 1919 compared unfavorably with 1918 when the average fare was about the same but when war camps had stimulated the traffic to a total of 21,517,796 revenue riders.

Further, a comparison of 1920 with 1919 shows that transfer passengers increased from 3,398,150 to 3,769,981 or nearly 10 per cent, proving that no privileges in that direction were withdrawn by the zone fare. The increase in revenue was from $971,174.04 to $1,330,275.54, an increase of 36.9 per cent. The number of car-miles increased in lesser ratio than the traffic (from 3,572,836 car-miles to 3,583,758 car-miles) as shown by the fact that the cash fare and revenue ticket passengers per car-mile increased from 5.76 to 5.83 and the revenue and transfer passengers combined from 6.70 to 6.89. The revenue per car-mile rose from 27.18 cents to 37.11 cents or 36.5 per cent.

More Revenue per Capita to Offset Private Automobiles

It appears from the report that the banner riding year of San Diego was 1913 when a population of 67,700 was carried 27,156,415 times (including transfer rides) yielding a revenue of $1,001,314, a riding index of 401.13 rides per inhabitant per annum and an average annual revenue of $14.79 per inhabitant. During the following years there has been a steady decline in the car-riding index, due permanently to the great increase in private automobiles and temporarily to the jitneys which flourished for two or three years. The zone system compared with the 5-cent year (1919) immediately preceding has had at least the satisfactory result of preventing any perceptible decline in riding due to increased fares, while raising the average annual revenue per inhabitant to a higher figure, $12.09, than it had been since the period 1914-1919. This is clearly brought out in Table III.

Sales Commission to Platform Men Equals 7.17 per Cent Bonus on Wages

A second reference to Table II shows that fare collection on the San Diego zone system is facilitated by the great proportion of convenient cash and ticket fares. Thus of the total, 38.44 per cent were 5 cents cash and 38.93 per cent were 7½-cent ticket, the latter being good for the same two-zone and inter-zone transfer ride as 10 cents cash. The high percentage of these "four for 30 cents" tickets is due to their being sold by the conductors on a basis of 3 per cent commission which is divided among all platform men in proportion to the number of platform hours worked by each man. The sales commissions distributed during 1920 as separate checks amounted to $22,220 or 3.167 cents per platform hour. This represents a bonus of 7.17 per cent over the regular average wage of 44.128 cents an hour. It may be of interest to add that certain duties, such as turning trolley poles, seats, dash signs and tail lights are now expected of the motorman, as the conductor, under the zone system, has some extra clerical duties.

Zone Fare Results Exceed Commission Estimates

The engineers of the California Railroad Commission estimated that the financial results for the twelve months following the adoption of the zone system would provide approximately $110,000 for fixed charges. As a matter of fact, the amount available for fixed charges was $219,635 or about 100 per cent more than estimated. However, it should not be expected that the zone system of fares will have any control over expenditures made for maintenance, operation, depreciation, taxes, etc. It is a system of fares affecting revenue only; and, as will appear when the full financial figures come to hand, the company must be relieved of certain burdens, particularly paving, before it can show a better return than 3.34 per cent on the investment.

TABLE II—CLASSIFICATION OF CASH AND REVENUE TICKET PASSENGERS, SAN DIEGO ELECTRIC RAILWAY, YEAR ENDED DEC. 31, 1920

Rate of Fare	Passengers Carried Number	Passengers Carried Per Cent	Revenue Collected Amount	Revenue Collected Per Cent
1⅞c. to 2½c.	763,005	3.65	$19,909	1.50
3¾c.	1,691,060	8.09	63,414	4.77
5c.	8,037,525	38.44	401,877	30.21
6¼c. to 6½c.	647,297	3.09	45,972	3.44
7½c.	8,140,449	38.93	610,533	45.90
10c.	985,892	4.71	98,591	7.41
12½c. to 15c.	518,358	2.48	66,372	4.99
17½c. to 25c.	126,001	0.61	23,607	1.78
Total	20,909,587	100.00	$1,330,275	100.00

TABLE III—SHOWING POPULATION SERVED, REVENUE PASSENGERS CARRIED, REVENUE RECEIVED FROM PASSENGER TRANSPORTATION AND AVERAGE RIDES AND REVENUE PER CAPITA PER ANNUM, SAN DIEGO ELECTRIC RAILWAY

Year	Population Served	Revenue and Transfer Passengers	Passenger Revenue	Average Rides per Capita per Year	Average Revenue per Capita per Year
1913	67,700	27,156,415	$1,001,314	401.13	$14.79
1914	75,800	23,595,012	930,089	337.67	12.27
1915	80,600	27,587,239	992,552	342.27	12.31
1916	86,700	24,525,162	932,003	282.87	10.75
1917	90,000	21,973,154	892,166	244.15	9.91
1918	100,000	24,660,128	1,030,745	246.60	10.31
1919	105,000	23,936,680	1,021,362	227.96	9.73
1920	110,000	24,679,568	1,330,275	224.36	12.09

Jitney Regulation Proposed in Birmingham

Regulation of Jitneys operating in Birmingham, Ala., is up before the City Commission and it is probable that some form of ordinance requiring liability insurance will be adopted. City Attorney Fred G. Moore is now working out an ordinance to be presented to the commission for action. Regulations adopted by a number of other cities and suggestions by local citizens and civic organizations are being studied before final drafts of the ordinance are prepared.

At a recent meeting of the commission an ordinance was introduced by Commissioner H. P. Burruss providing for regulation of the jitneys. The ordinance was in form of a suggeston to the commission and Mr. Burruss asked that it be referred to the City Attorney to form the framework for an ordinance to be adopted.

Liability insurance in the sum of $5,000 in the case of an accident resulting in the injury or death of one person and of $10,000 in the case of the injury or death of any number of persons was provided in this ordinance. It also provided for the protection of jitney passengers as well as a pedestrian and other vehicles.

Vigorous protests against the adoption of the ordinance or any similar ordinance were made by a number of jitney operators. They maintained that the insurance would be prohibitive, though it was provided in the original ordinance that any number of cars operated by a single owner could be protected under a single policy.

The proposal to regulate the jitneys and require insurance has been endorsed by a number of the local civic organizations. It is probable that the final ordinance will provide for insurance protecting pedestrians and other traffic but not jitney passengers.

Ignorance of Hassenpfeffer Kills Ordinance

After more than an hour of debate at the last meeting of the City Council of Toledo, Ohio, an ordinance proposed by Commissioner Wilfred E. Cann barring dogs—except crated or lap dogs—from city street cars was laughed down and defeated.

Regular fares have been charged for dogs but recently a conductor was bitten by an unruly dog and complaint was made against all of the canine family.

Councilman Dominick Foy proposed an amendment which would permit dogs muzzled and leashed to be carried during the hunting season. Another councilman went to bat for dog fanciers and championed the Airedale, of which Toledo family President Harding's "Laddie Boy" is one of the most famous. Another member challenged the statement that the Airedale was a "hunting dog" or a "one-man dog."

When an assistant law director drafted the amendment permitting dogs to ride for full fare during the "hunting season" he made plain that he didn't know what hunting season was meant—hassenpfeffer, squirrel, muskrat or anything else.

The amendment carried, however, and then the whole question was voted down and dogs will continue to enjoy street car rides as regular 6-cent passengers.

Sustains Ten-Cent Fare

Supreme Court Justice MacCrate in Brooklyn on May 2 denied the application of the city for an injunction restraining Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, Brooklyn, N. Y., from continuing to charge a double fare on the Broadway, Reid Avenue, Wilson Avenue, Franklin Avenue and Smith Street car line. The court said:

> The determination of the Public Service Commission, after hearings, is that these lines are now unprofitable. An injunction may mean their discontinuance. It seems to me better that the public should be transported than that they should be forced to walk.

The 10-cent fare was permitted on these lines on March 12. The city claimed it was illegal. The Brooklyn Rapid Transit contended that one fare could be charged for a ride within the old city limits and another for the continuance of a ride to outlying districts.

Transportation News Notes

Fares Declared Lawful.—The Interstate Commerce Commission held on April 26 that the one-way round-trip and commutation fares between stations on the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., were not unreasonable or otherwise unlawful. The complaint was made by the commuters' club.

Advertising Campaign in Dallas.—The Dallas (Tex.) Railway is conducting a publicity campaign at this time with the object of improving service and eliminating any dissatisfaction among patrons of the company. The campaign is under the direction of Dan Fisher, assistant to President J. F. Strickland. Extensive newspaper advertising is being employed, in addition to personal work among the trainmen and large display posters in the cars.

Higher Fares Asked in Helena.—The Helena Light & Railway Company, Helena, Mont., recently petitioned the Railroad & Public Service Commission for a 10-cent fare in the city of Helena and 15 cents in East Helena. The company also asks permission to sell commutation tickets at the rate of forty for $2, to be used within city limits. The present rate of 7 cents with 6¼ cents where tickets are used went into effect on July 1. The company in its petition declares that this award of the commission was not sufficient to net the railway a reasonable return.

Motormen and Conductors Praised.—W. H. Sawyer, president of the Alton, Granite & St. Louis Traction Company, Alton, Ill., in a letter to the superintendent of transportation and roadway, has complimented the motormen and conductors for their co-operation in the safety work which has been under way for some time. Statistics were prepared and definite figures show that real results are being produced. Comparing the year 1917 with 1920 the total number of accidents has been reduced approximately 23 per cent despite the fact that accidents due purely to automobiles have increased 50 per cent.

Action on Fargo Fare Expected.—The North Dakota Railroad Commission recently arranged to take final action on the question of rates charged by the Northern States Power Company, Fargo, N. D., on its railway. The present 7-cent rate now in force in Fargo, village of North Fargo, N. D., and Moorhead, Minn., became effective last June when the commission ruled that the new rate was temporary pending final determination of the company's property valuation. The justification for continuing the 7-cent rate will depend upon the railway's income and expense accounts which will be reviewed in detail at the coming hearing.

Interurban Rate Increased.—The Public Service Commission has authorized the Interstate Public Service Company, the Indianapolis & Louisville Traction Company, the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company to increase their passenger fare rates basis from 2⅜ to 3 cents a mile. These companies all operate a continuous line between Indianapolis and Louisville and their petition said that all other electric traction companies in the State are receiving 3 cents a mile for passenger service and that railroads were receiving 3.6 cents a mile.

Suburban Line Increases Fare.—Under an order issued by the Public Utilities Commission the Northern Ohio Traction & Light Company, Akron, Ohio, began the collection of a 20-cent fare between New Philadelphia and Uhrichsville on March 7. The former rate was 10 cents. The change in fare follows an application filed by the company six weeks ago. The county grant expired at that time and March 7 the city grant at Uhrichsville expired. Negotiations have been going on for some time looking toward a new franchise, but so far no agreement has been reached. Patrons of the line paid the fare without complaint. Recently the company has been conducting an advertising campaign along the line showing the cost of carrying passengers. These figures indicated that a 20-cent fare was necessary. The distance is ten miles.

Suburban Line to Increase Fare.—J. F. Strickland, president of the Texas Electric Railway and also president of the Dallas (Tex.) Railway, announces that fare on the Trinity Heights line, which consists of suburban service through the Trinity Heights addition to the city of Dallas operated over the lines of the Texas Electric Railway, will be increased. The present fare to Trinity Heights is 5 cents, the rate not having been increased when the fares in the city of Dallas were raised to 6 cents. Although the Trinity Heights service is operated over the lines of the Texas Electric Railway the Trinity Heights cars traverse the tracks of the Dallas Railway down town and across the Trinity River bottoms to Oak Cliff, where they leave the rails of the Dallas Railway for the Texas Electric Railway. The contract under which the service to Trinity Heights was established about two years ago has expired and a new contract must be negotiated with the Dallas Railway for the use of its tracks, and Burr Martin, vice-president and general manager of the Texas Electric Company, and Richard Meriwether, vice-president and general manager of the Dallas Railway, are now negotiating for a new contract. The fare increase will be started at the time the new contract goes into effect.

Personal Mention

Noted Engineer President

W. S. Lee, Formerly Vice-President, Has Been Chosen to Head Piedmont & Northern Railway

William S. Lee, Charlotte, N. C., has been elected president of the Piedmont & Northern Railway by the directors of that property. Mr. Lee, for some time vice-president, succeeds the late Z. V. Taylor.

Mr. Lee is vice-president and chief engineer of the Southern Power Company, Charlotte, N. C., a position he has held since 1905 when the company took over other power companies and purchased larger power rights. In this capacity, with the financial assistance of J. B. Duke as president of the organization, he has designed and constructed eight hydro-electric plants and four steam stations with an aggregate capacity of 280,000 kva.

W. S. LEE

It is rather interesting to note that Mr. Lee's first practical experience was as resident engineer with a small street railway in South Carolina, which later he left to take up work dealing with power generation. Now one most naturally associates his name with water-power development and electrification of industries in the South, where his leadership and engineering ability have accomplished marvels.

Under Mr. Lee's direction, the Piedmont & Northern Railway has been built up since 1911 so that now it is a system operating 130 miles of track. A high-speed interurban service is furnished, operated at 1,500 volts direct current from the Southern Power Company's system.

The standards devised by Mr. Lee through experience in pioneer design and installation of power transmission equipment have been widely reflected in the practices of other large companies.

About a year ago Mr. Lee established a consulting engineering office in New York. He already had an engineering staff in Charlotte which now works in conjunction with the New York office.

Mr. Lee was born in Lancaster, S. C., on Jan. 28, 1872, and was graduated from the South Carolina Military Academy in 1894. His early experience was with the Anderson Water, Light & Power Company, Anderson, S. C., where he was engineer in charge of the construction of the Portman Shoals hydro-electric plant. There he placed in service in 1898 the first 11,000-volt generator to be installed in America. His record also includes association with other power companies. Many of these companies have since been taken over by the Southern Power Company.

R. W. Meade Resigns as President of Detroit Motorbus Company

Richard W. Meade has resigned as president and general manager of the Detroit (Mich.) Motorbus Company. He formerly was president and general manager of the Fifth Avenue Coach Company, New York. Mr. Meade has been responsible for providing in Detroit urgently needed motor transportation facilities by supplying a service similar to that which has proved so useful and popular in New York. The present scope of the system and the results of seven months' operation formed the basis of an article in the issue of the ELECTRIC RAILWAY JOURNAL for April 23.

Mr. Meade has made no definite plan for the future as yet, but he expects to remain in the bus business, in which he sees a great future. He will not, for the present at least, resume his connection with the Fifth Avenue Coach Company.

Mr. Meade was formerly a street railway man, at one time having been connected with the Metropolitan Street Railway, New York, now the New York Railways, as assistant to the president. His previous experience also includes long service in steam railroading.

H. M. Addinsell, Chairman of P. S. Securities Committee

H. M. Addinsell, of Harris, Forbes & Company, has been appointed chairman of the Public Service Securities Committee of the Investment Bankers' Association of America. Mr. Addinsell, whose appointment was announced by Roy C. Osgood, president of the association, succeeds O. B. Willcox, who recently resigned from the board of governors. Pierrepont V. Davis, of the National City Company, was appointed chairman of the Railroad Securities Committee.

Steam Road Man Chosen

F. H. Wilson of N. Y. C. Elected President of Cleveland, Southwestern & Columbus Railway

Frank H. Wilson, for thirty-three years connected with the New York Central and Big Four Railroads, was elected on April 26 to fill the position of president and general manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. He will fill the vacancy created at the first of the year by the resignation as president of F. E. Myers of Ashland, Ohio, to become chairman of the directorate.

Mr. Wilson becomes general manager of the Cleveland, Southwestern & Columbus Railway as well as the president because of the continued ill health of E. F. Schneider, general manager. Because of the condition of his health Mr. Schneider was given a three months' leave of absence, which is about to expire. Mr. Schneider says he believes he can resume some sort of work, while the officers of the company feel that it will be necessary for Mr. Wilson to act as general manager, although Mr. Schneider will be retained in some sort of a capacity.

F. H. WILSON

Mr. Wilson is a steam road man who came up from the ranks. He began his railroad career in Indianapolis as a messenger boy for the Indiana, Bloomington & Western Railway in 1887. He spent the next sixteen years climbing from one position to another in the service of the Big Four.

Ten years ago he went to the New York Central lines as assistant general superintendent of the Lake Shore and Michigan Southern Railway, and four years ago was promoted to the position of general superintendent of the Cleveland district, embracing New York Central territory from Buffalo to Toledo and south. When Mr. Myers resigned Jan. 1 the directors appointed a committee to hunt for a man to take his place and on the recommendation of the committee the election was made.

Otto Miller, of Hayden, Miller & Company, was elected a member of the board and made chairman of its executive committee.

President Devlin Leaves California Commission

President Frank R. Devlin of the California State Railroad Commission on April 26 resigned his position on account of his desire to return to general practice of law, in which he had been previously engaged for eighteen years. Mr. Devlin formerly was district attorney of Solano County, Cal., where he had also served as superior judge. He was a member of the 1911 California State Legislature. Mr. Devlin succeeded E. O. Edgerton as president of the commission when the latter's term expired recently. Chester H. Rowell replaced Mr. Edgerton on the Commission.

H. Stanley Benedict of Los Angeles, an attorney and former member of the State Legislature, and an active member of the State Board of Control with offices in Los Angeles and Sacramento, has been appointed to membership on the State Railroad Commission as a successor to Mr. Devlin. Mr. Benedict has been a resident of Los Angeles for 35 years and has been prominently connected with state projects, offices and politics.

Successful Mediator on California Commission Resigns

After opening and for eight years managing the Los Angeles office of the California State Railroad Commission, Miss Janet Converse on April 26 tendered her resignation to the Railroad Commission in San Francisco. That credit for the highly successful work of the commission in southern California is due Miss Converse was the finding of a committee which recently made a survey of that commission. She is now resigning to engage in business for herself in the field of industrial surveys and public relations.

In the eight years Miss Converse has been in charge of the Railroad Commission's work in southern California, she has adjusted more than four thousand informal complaints without a court hearing before the commissioners. Her policy of inviting parties to a dispute over public service to come to her office and there discuss the subject freely and openly has done much to promote proper understanding between utilities and regulatory bodies and the public. Such conferences have brought executives of the utilities in direct touch with complainants.

Absence of a standard of service for street railways and other public utilities in many communities shows an important work which can benefit both the public and the public utility companies, according to Miss Converse and it is to this subject she will devote her energies. Each man in a city has a different idea of the service the street railway should render and a different complaint to be made to regulatory bodies. This situation presents many difficulties and can be met best by some organization or agency acting independently in a survey of conditions in communities where no standard exists.

Miss Converse was well experienced in organization work when she became secretary of the Southern California Railroad Commission, having had the honor of directing the first woman's political campaign in Los Angeles.

Mr. Mathews Leaves B. R. T.

Superintendent of Surface Roadway in Brooklyn Takes Like Position with Third Avenue Railway

E. L. Mathews has resigned as superintendent of surface roadway of the Brooklyn (N. Y.) Rapid Transit Company to take up similar duties in the maintenance organization of the Third Avenue Railway, New York.

Before going to Brooklyn in 1908 Mr. Mathews served some ten years as superintendent of construction for contracting and engineering firms in Baltimore, Md., and was in charge of the rebuilding of a number of street railway lines in that city. Later he was superintendent of construction during the building of the Philadelphia & Western Railway, Norristown, Pa. In 1907 he made an extensive physical examination of the street railways in San Francisco for the firm of Newhall & Company, just prior to the merger of a number of properties there.

In 1908 Mr. Mathews organized the track department of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., and later became engineer of way and structure for that company, holding this position until the merger with the Brooklyn Rapid Transit System. Entering the way and structure department of the latter company as assistant engineer in charge of maintenance in 1915 he ultimately took over the active field direction of the surface maintenance with the title of superintendent of surface roadway.

State's Directors of Providence Railway Appointed

Governor San Souci of Rhode Island on April 20 sent to the Senate the appointments of Zenas W. Bliss, of Cranston, and George H. Newhall, of Providence, as directors of the United Electric Railways, Providence, R. I.

Mr. Bliss, who is chairman of the State Tax Commission, is now president of the temporary organization of the trolley corporation. Mr. Newhall, state bank commissioner, is the present treasurer of the temporary company.

These appointments are made by the Governor under the act incoroporating the United Electric Railways, passed by the legislature two years ago which provides that there shall be two members of the board of directors representing the state.

C. E. Hart has been named chairman of the Findlay (Ohio) Street Railway Commission which took charge of the operation of the cars under a cost-plus form of franchise recently approved for that city. Eight-cent fares are in effect, but the commission warned citizens to support the lines or an advance to 9 cents would become effective in three months.

J. H. Libbey, who recently resigned as engineer of power and electric lines of the Eastern Massachusetts Street Railway Company, has become connected with H. M. Haven and William W. Crosby, engineers and architects, Boston, Mass.

Obituary

H. S. Graham

Howard S. Graham, president of the Washington-Virginia Railway, Washington, D. C., died on April 10. Mr. Graham was very active in public utility work and was also a banker and broker of great energy and enterprise.

He was probably best known as senior member of the banking and brokerage firm of Graham, Parsons & Company, with offices in both Philadelphia and New York. He had been actively engaged in this line of business for many years and his equitable business policies and integrity of purpose had secured for him a warm and sincere friendship in the various walks of life.

Hardin H. Littell

Hardin H. Littell, seventy-one years old, formerly general manager of the Louisville (Ky.) Railway, died suddenly on April 28 at his home in Buffalo, N. Y., where he had been president and general manager of the Buffalo Railway. He was one of the organizers and the first president of the American Electric Railway Association and was recognized as one of the most capable railway men of America.

Entering the service of the Louisville Railway when 17 years old, Mr. Littell rose rapidly through merit of his ability. He resigned in 1891 to become head of the Buffalo car system.

Born in Corydon, Ind., Mr. Littell attended the country schools of Harrison County until 12 years old. He began his business career as a clerk in a drygoods store, later going with a jewelry store.

In 1864 Mr. Littell became office boy in the office of the late Gen. J. T. Boyle, who first successfully organized a street car system in Louisville. At the age of 22 Mr. Littell was made superintendent. After leaving Louisville Mr. Littell served as president of the Buffalo, Bellevue & Lancaster Railway and president of the Cincinnati (Ohio) Inclined Plane Railway.

He was one of the largest stockholders in the Louisville Railway Company and served as a director until the management was changed a year ago. He retired from business some years ago following the sale of the Buffalo Railway to the International Traction Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Spring Buying of Rail Bonds for Maintenance

Large Producer Reports Demand Ahead of Last Year; Others Find Less Activity

Although one of the largest rail bond manufacturers reports a demand that on the whole is normal and perhaps even a little heavier than last year, other producers do not find the market especially active this spring. One factor in the buying that is noted by all interests is that electric railways are not stocking rail bonds heavily and are ordering almost entirely for maintenance work rather than on behalf of new track construction.

Whereas most producers, however, state that maintenance buying is down to the lowest possible minimum, the exception heretofore noted reports that, inasmuch as repairs to bonds and other track equipment have been neglected so much in the past, there is a large amount of work that absolutely has to be done this year. Rail bond business so far as coal mines are concerned is far below normal, for with the present slack operating conditions in the soft coal industry buying from that source is light.

Stocks of the finished product are not uniform. Some producers have good stocks on hand and can make immediate shipments, but several others do not follow a policy of stocking as a general rule and hence are quoting deliveries of one to three weeks. Production is curtailed at present, though at least one of the leading manufacturers is proceeding to build up a sizable stock. This action may possibly be influenced by the steadiness of copper prices which have shown some tendency to firm slightly.

Rail bond prices have not changed since the first of last December, when an increase of 5 points in the discount, following several previous recessions from the peak price, brought the quoted discount to its present level of 25 per cent. The opinion is generally expressed that prices have reached bottom in view of the position of the copper market.

Steel Corporation Announces Wage Reduction

The United States Steel Corporation, through Judge E. H. Gary, on May 3 announced a wage reduction of 20 per cent, effective May 16, in the pay of day laborers at the manufacturing plants. Since the reduction in price of steel by the corporation a few weeks ago, the question of a wage reduction has been thought by the trade to be merely a matter of weeks. Announcement is also made of a reduction in the hours of production per day. In some departments the twelve-hour day has been abandoned and efforts are being put forth to extend this to all departments before the year is out. Other mills have experimented with the 8-hour day innovation with satisfactory results.

Trolley Wire Production at 50 per Cent of Capacity

Though Present Buying Is Only for Maintenance, Producers Are Hopeful of Improved Demand Soon

Conditions in the market for trolley wire are apparently uniform with virtually all producers. The general practice is to cut overhead to a minimum and wait for business to open up. Accordingly operation in most cases is at only 50 per cent of capacity, this curtailment being accomplished by operating but three days a week in some cases and by reducing labor forces in others.

Despite this reduced output stocks of trolley wire with those producers who normally carry a surplus supply, are in ample shape to make immediate shipment on such orders as are coming in. Many producers, especially of plain copper trolley wire, do not usually stock their product, and in these instances orders can be filled in about one week.

Buying is only for repairs and light at that. Producers report that electric railways are not stocking trolley wire to any extent, in fact, because of the delivery situation this is not necessary, and as there are few if any new extensions under way, orders cover only essential maintenance needs and nothing more. There is general optimism expressed by wire manufacturers, however, that an improvement in business in this line is not too far distant. Although the spring is normally the buying season for trolley wire there is a general view that starting with the summer better buying will be felt. The basis for this optimism is largely the good potential market and the possibility of relief from the pressing question of labor readjustments in the industry.

Prices of trolley wire have held steady for quite some time and in view of the low position of copper with its slight tendency to firm in price recently, it seems questionable if quotations can go much, if any, lower. Producers are generally quoting on a 15-cent base though one manufacturer whose product is not all copper is on a 14½ cent base.

Manufacturers Have Low Stocks of Turnstiles

Railways Have Not Entered Market, but Good Demand from Amusement Parks Has Reduced Supply

Prices of turnstiles are still virtually at the peak level of last year, producers report. The chief item in the cost of manufacture is labor, and labor costs in this field, it is stated, are no lower except as greater efficiency of workmen serves to reduce expenses. The price element is not thought to be an important factor in the light buying of turnstiles this spring, however, as there is said to be little likelihood of any decrease in price being made this year.

The main factor in the market is the fact that electric railways have not the money to make new extensions such as building stations and terminals where turnstiles would be used. There is some buying of repair parts of course but as there is never much call for replacements of the finished product the market this spring falls far below that of other years. On the other hand, a good demand has resulted from privately-owned amusement parks and this has either cleared out manufacturers' stocks or reduced them to very low levels.

The general policy now is not to stock turnstiles. Consequently, some producers are turning out this product only on order while others could produce twice as many machines as at present, if it were necessary. Deliveries are not from stock, for the good reserve supply that was built up during the past winter has been exhausted, but at the same time shipments can be made promptly. Inasmuch as turnstiles are largely a seasonable spring product, there does not seem much prospect that the market will open up very much later this year.

Toronto Places $1,270,000 Order for New Cars

The Toronto Transportation Commission, which will have jurisdiction over the operation of the Toronto Railway system when the franchise expires next September, at a meeting on April 26 awarded a contract to the Canada Car & Foundry Company, Montreal, for 100 motor and 60 trailer cars amounting to about $1,270,000, exclusive of the electrical and air-brake equipment. It is expected the latter equipment will be purchased either from Canadian or British firms or possibly both. Bids on the car bodies were received from several car manufacturers in the United States, but when exchange rates were taken into consideration the bids submitted were not considered favorably.

The cars will have all-steel bodies. The motor cars will be 51 ft. 8 in. long and 8 ft. 6 in. wide while the trailers will be 49 ft. long and the same width as the motor cars. The seating capacity of the motors will be 57 passengers and the trailers will seat 61. General Manager H. H. Couzens states that a substantial number of the cars will be delivered by the first of next September.

The seats will be of wooden slats; windows of plate-glass and the lower panels in the doors of wired glass. The price for both types is considerably below the original figures received by the Commission. The first estimates were about $27,000, and it is expected that the cars will be placed in service next fall at a final cost of between $17,000 and $18,000 each. Though the contract has been awarded, the Transportation Commission, to comply with the law, must submit the specifications and design for the approval of the Ontario Railway and Municipal Board. This will be done immediately.

Electrification Planned in Jamaica

A $10,000,000 project for the electrification of the Government Railway is planned by the Jamaican Government, according to the *Times Trade Supplement*, London. Of this amount it is said the pipe and conduit lines will cost about $2,000,000, on which a 5 per cent saving can be effected by buying from the United States. Seven substations at a cost of $800,000 are suggested, while trolley wire, feeders, transmission and communication lines will total $4,000,000. Twenty-one electric locomotives are estimated at $1,250,000.

Stock Deliveries of Metal Culverts

Railway Buying Small Compared with Highway Demand—Prices Drop 35 to 40 per Cent This Year

Demand for metal culverts with both steam and electric railways does not shape up very large in comparison with the general culvert business, producers report. Some inquiries are received and a few orders are being placed, and though even this spring the railway demand is probably better than has been the case for the past few years, it is by no means up to the old standard of before the war. Culvert manufacturers apparently believe that a large potential market exists in the railway field, however, as some of them are doing considerable circularizing and advertising there.

At the beginning of this year the culvert business looked good in view of prevailing lower prices, better railroad facilities, improved operating conditions and quicker deliveries. Since then there seems to have been a general slowing down of buying, though the demand from highways still causes total sales to hold up to about normal volume if we eliminate from consideration the abnormal demand of last year. Producers are quite generally optimistic that the present year on the whole will yield good results. Extensive road building programs are under way throughout the country, though the work is temporarily set back awaiting a new congressional appropriation for Federal aid in road building.

Little possibility is seen that deliveries will be in anywise pushed for long to come. Stocks of finished culverts are being kept up well so that immediate shipments can be quoted on standard material at present, while sheet mills are keen for business and compete with each other in giving culvert manufacturers prompt shipments. There is likewise considerable competition among culvert producers for large orders, even for those which yield only a small margin so that plants may be kept running at the present normal rate of operation.

Prices in this market are decreasing in an orderly way commensurate with the drop in material costs. A representative producer who increased prices from 15 to 25 per cent during 1920 has lowered quotations from 35 to 40 per cent thus far this year. In general culvert prices are on a very reasonable basis compared with pre-war prices.

Rolling Stock

The United Railways and Electric Company of Baltimore, Md., on April 25 placed an order with the J. G. Brill Company for ten safety cars.

Municipal Railway of San Francisco, Cal., is making final arrangements to purchase thirty light-weight, single-truck, center-entrance street cars. They will be 29 ft. long, will weight 13 tons, and will be equipped with two 50-hp. motors.

Worcester (Mass.) Consolidated Street Railway Company is equipping twenty of its regular double-truck cars for one-man operation. The cars, which are being refitted in the company's own shops, will not be equipped with standard safety devices. A manual door controlling handle and an original safety device for passengers to release the car doors by pulling a lever if necessary, are being installed.

NEW YORK METAL MARKET PRICES

	Mar. 30, 1921	May 4, 1921
Copper ingots, cents per lb	12.75	12.62½
Copper wire base, cents per lb	15.00	14.50
Lead, cents per lb	4.10	4.75
Nickel, cents per lb	41.00	41.00
Zinc, cents per lb	5.15	5.45
Tin, cents per lb	29.37	31.87½
Aluminum, 98 to 99 per cent, cents per lb	28.00	28.00

OLD METAL PRICES—NEW YORK

	Mar. 30, 1921	May 4, 1921
Heavy copper, cents per lb	9.50 to 10.25	10.00 to 10.50
Light copper, cents per lb	7.00 to 8.50	7.50 to 8.00
Heavy brass, cents per lb	5.50 to 5.75	5.50 to 5.75
Zinc, old scrap, cents per lb	2.87 to 3.00	2.87 to 3.00
Yellow brass, cents per lb	4.00 to 4.25	3.75 to 4.00
Lead, heavy, cents per lb	3.25 to 3.50	3.75 to 3.90
Steel car axles, Chicago, per net ton	14.50 to 15.00	14.00 to 14.50
Old car wheels, Chicago, per gross ton	13.50 to 14.00	13.50 to 14.00
Steel rails (short) Chicago, per gross ton	12.00 to 12.50	13.00 to 13.50
Steel rails (rerolling), Chicago, gross ton	12.00 to 12.50	12.50 to 13.00
Machine shop turnings, Chicago, net ton	5.50 to 6.00	5.00 to 5.50

ELECTRIC RAILWAY MATERIAL PRICES

	Mar. 30, 1921	May. 4, 1921
Rubber-covered wire base, New York, cents per lb	16.50	16.00
Weatherproof wire base, New York, cents per lb	17.50	15.50
Standard Bessemer Steel Rails, per gross ton	45.00	45.00
Standard open hearth rails, per gross ton	47.00	47.00
T-rail, high (Shanghai), per gross ton, f.o.b. mill	.....	.....
Rails, girder (grooved), per gross ton, f.o.b. mill	.....	.....
Wire nails, Pittsburgh, cents per lb	3.00 to 3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.65	3.40
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb	6.00	6.00
Fish plates, cents per lb	2.75	2.75
Angle bars, cents per lb	2.75	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	5.00	4.50
Steel bars, Pittsburgh, cents per lb	2.00 to 2.35	2.10
Sheet iron, black (24 gage), Pittsburgh, cents per lb	3.70 to 4.20	3.85
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	4.55 to 5.25	4.55
Galvanized barbed wire, Pittsburgh, cents per lb	3.85 to 4.10	4.10

	Mar. 30, 1921	May. 4, 1921
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70 to 3.95	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount*	77%	82%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	82%
Car window glass (double strength, all sizes, A quality), New York, discount	79%	83%
Waste, wool, cents per lb	11 to 17	11 to 17
Waste, cotton (100 lb. bale), cents per lb.		
White	9.00 to 13.00	9.00 to 13.00
Colored	7.00 to 11.00	7.00 to 11.00
Asphalt, hot (150 tons minimum), per ton delivered	40.00	33.00 to 35.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	36.00	33.00 to 36.00
Asphalt, filler, per ton	36.00	36.00
Cement, New York, per bbl	3.50	3.20
Linseed oil (raw, 5 bbl. lots), New York, per gal	.68 to .70	.63
Linseed oil (boiled, 5 bbl. lots), New York, per gal	.70 to .72	.65
White lead (100 lb. keg), New York, cents per lb	.13	.13
Turpentine (bbl. lots), New York, per gal.	.54	.67 to .68

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* These prices are f.o.b. works, with boxing charges extra.

Recent Incorporations

Texas Interurban Railway, Dallas. Tex.—The Texas Interurban Railway of Dallas, Tex., has been granted a charter by the Secretary of State at Austin. This is the company organized by the Strickland interests for the building of an interurban line from Dallas to Terrell, under the commitments made in the charter granted by the city of Dallas in 1917. The company is capitalized for $2,500,000, and the purpose as given in the charter is to construct and operate an electric interurban line from Dallas to Terrell, Tyler, Greenville, Paris and Denton. The incorporators are J. F. Strickland, C. E. Calder and C. W. Hobson. Other directors are: R. L. Thornton, Dallas; Walter Allen, Terrell; L. E. Griffith, Terrell; L. J. Rodney, Forney; J. C. Rugles, Mesquite; Schuyler Marshall, Mesquite. J. F. Strickland, president of the company, said that only the Terrell line would be built now, but that the company later may undertake the construction of other lines as provided for in the charter.

Track and Roadway

Lawton Railway & Lighting Company, Lawton, Okla.—Extension of the car lines of Lawton, Okla., to Fort Sill and Medicine Park is proposed by the Lawton Railway & Lighting Company, according to announcement by B. S. Stephens, its president. The proposed extension will pass through the military reservation of Fort Sill and extend about nine miles beyond to Medicine Park, which is fast becoming "the playground of Oklahoma." Plans for financing the extension, which will cost about $300,000, contemplate the sale of $60,000 of 7 per cent bonds of the present company to the people of Lawton, and when this is done St. Louis capitalists have promised to carry the project through by advancing the $240,000 remaining. Construction of the line will begin as soon as the financial details are completed.

Dallas (Tex.) Railway.—The question of forcing the Dallas Railway to comply with commitments made when the charter was granted in 1917, for the building of a double-track concrete viaduct across the Trinity River bottoms for the Oak Cliff lines, is being agitated by the Oak Cliff Commercial Association. The traction company soon after the franchise was granted constructed a portion of the viaduct, that portion over the tracks of the steam railways, thus eliminating a dangerous grade crossing, but building the rest of the viaduct was delayed on account of the cost of material. The traction company has done no further work toward the building of the viaduct, and the Oak Cliff citizens are growing restive and want immediate action.

Wichita Falls (Tex.) Traction Company. — The Wichita Falls Traction Company expects to build a new car line which will extend from Indiana Street out Sixth or Seventh Street to connect the city with residential sections now without service.

Dallas-Wichita Falls (Texas) Interurban.—Early construction of the Dallas-Wichita Falls Interurban line has been abandoned, due to inability to finance the line at this time. This action is being taken now that the Dallas Railway has already begun construction on the Dallas-Terrell line under commitments made in the 1917 charter. The plan was to have the Dallas Railway build the line to Wichita Falls in lieu of the shorter lines for which it was committed. Under the preliminary financing details, a fund of $1,000,000 was raised in Dallas and $500,000 in Wichita Falls. The General Electric Company then agreed to donate an equal amount and $4,500,000 first mortgage bonds was to be sold. Promoters of the line failed to dispose of the first mortgage bonds. Funds collected in Dallas and Wichita Falls are now being returned to the donors by Wiley Blair of Dallas, chairman of the interurban committee.

Power Houses, Shops and Buildings

Cleveland (Ohio) Railway. — The headquarters of the Cleveland Railway are now located in the new Hanna Building, Euclid Avenue and East Fourteenth Street.

Henryetta, Okla.—R. D. Long, former manager of the Muskogee (Okla.) Electric Traction Company, is attempting to finance a mammoth power plant proposal with a network of interurbans connecting Oklahoma City with Henryetta, Okmulgee and Muskogee. He is supposed to have the assurance of Eastern capital to insure completion of his plans. The proposed power plant is to be located at Henryetta, in the heart of the coal producing section of the state. The proposition is to supply most of the cities and towns of eastern Oklahoma with power from this plant.

Trade Notes

The Franklin Railway Supply Company, Inc., has moved its New York offices from 30 Church Street to 17 East Forty-second Street.

The Connecticut Blower Company, Inc., Hartford, Conn., contemplates the construction of a manufacturing and foundry building, for which plans have been prepared. The cost is estimated at $62,500.

The Johnson Fan & Blower Company has been organized, with headquarters at 115 South Clinton Street, Chicago. A. J. Johnson, formerly assistant general manager of the Ilg Ventilating Company, Chicago, is at the head of the new concern. The company will manufacture ventilating fans and blowers.

The American Forge & Manufacturing Company, 2433-41 West 48th Street, Chicago, has announced its readiness to supply copper forgings of all sorts, those for motors and motor control apparatus being its specialty. Production was started Oct. 1, 1920, and according to the announcement has reached the point where all orders can be filled.

The Eureka Stone & Marble Company, 179 West Maple Street, Columbus, Ohio, has been incorporated in the State of Ohio at $350,000 to take over the assets, good will, contracts and all other manner of business of the Eureka Marble & Tile Works Company, at the same address. Standard moisture-proof switchboard will have a special space and the company hopes to double its output in their manufacture.

The Black & Decker Manufacturing Company, Towson Heights, Baltimore, announces that its New York branch office, formerly at 141 Broadway, is now in the Printing Crafts Building, Eighth Avenue and Thirty-third Street, where a service station with stocks is also located. The Detroit branch office has been removed from 19 Selden Avenue to 27 Watson Street. The Atlanta branch office is now at 1508 Candler Building, where Thomas W. Peters, branch manager for the Southern territory, will make his headquarters.

New Advertising Literature

Engineering. — Warren D. Spengler, engineer, Hanna Building, Cleveland, is publishing a series of "Engineering Service Talks."

Foundry Sand Cutter.—The Whiting Corporation, Harvey, Ill., is distributing a four-page folder describing its motor-driven sand-cutting and screening machine for use in foundries.

Signals.—Magnetic Signal Company, Hellmann Building, Los Angeles, Cal., has issued an illustrated bulletin entitled "Safety With Economy," showing the principles and method of application of its magnetic "flagman."

Flexible Cords and Cables.—The Simplex Wire & Cable Company, 201 Devonshire Street, Boston, has developed solid-rubber-covered reinforced two-conductor and three-conductor portable cords and cable for heavy duty.

Track Grinding Machines.—Railway Trackwork Company, Clementine, Thompson and Mercer Streets, Philadelphia, has recently issued a loose-leaf bulletin on railway track equipment, giving detailed illustrated descriptions of reciprocating and rotary rail grinders.

Regulation.—"Progress in Regulation" a brief résumé of the present trend of opinion among the regulating bodies, is being circulated by Harris, Forbes & Company, New York. An account is given of the increases in rates awarded to public utility companies and extracts are published from decisions of commissions in several states.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

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Send Large Delegations to Atlantic City in October

IN VIEW of all the circumstances, the selection of Atlantic City as the place for the fall convention appears to be a wise one. Undoubtedly there are many railway men in the East who would have been pleased if the choice had fallen upon a city in the Mid-West, like Chicago, Indianapolis or Cleveland. Much has been published about railway practice in these cities, and if one of them had been chosen, an easy opportunity would have been afforded for Eastern railway men to see directly some of the construction and practice about which they have heard and read. Nevertheless, Atlantic City possesses the great advantage that the hotels are fairly near together and there are not the distractions from attendance at the meetings incident to a convention in a large city and due largely to the opportunities for excursions to points of interest. After all, the formal discussions in the meeting halls and informal ones outside are the main purposes of the convention. If these purposes are best secured at a meeting place like Atlantic City, then the choice of that place is justified.

The exhibits will necessarily be missed, especially at Atlantic City, but the decision to omit them applies only to this year. If conditions are more favorable next year, the exhibits will be appreciated all the more because of this year's omission. But each member company, including the manufacturing companies, should send as many delegates as it can afford to Atlantic City in October of this year, for the program of subjects is bound to be an attractive one, and the convention will be well worth the trip, in spite of the absence of exhibits.

Tendency to Settle Wages Without Strikes Is Gratifying

THERE has been a growing and gratifying tendency in electric railway labor matters for companies and men to settle their wage questions directly and without the intermediation of arbitrators. A number of cases of this kind have already been mentioned in previous issues of this paper. Another and conspicuous instance occurred last week when the employees of the Detroit United Railways agreed by a vote of four to one to accept the company's offer in its entirety. In this case three propositions were submitted for consideration, namely, acceptance, arbitration and strike, and the first was adopted by a vote as compared with the second of seventeen to one and as compared with the third of five to one.

Of course a decision of this kind cannot be reached unless the question is approached by both sides in a spirit of reasonableness and desire for settlement. Even when this is done, resort must often be had to arbitration, and it is no reflection on the attitude taken by either side when the opinions of impartial arbitrators are asked. But a direct settlement, where possible, is quicker and more preferable.

It has also been noticeable and gratifying that the number of electric railway strikes over wage reductions during the past six months have been very few. In fact, except for Akron, where the men stopped work on May 5, but later went back, pending arbitration, Albany has been the only conspicuous case of a strike, and the company there was the first of the larger companies to make a wage reduction. There were many dire predictions of industrial trouble to follow a decrease in wages when the lowering cost of living foreshadowed such a reduction, but fortunately these predictions proved false. Undoubtedly both sides have been anxious to avoid strikes, one reason being that the men know the extent of present unemployment, while the companies realize that during the past few years, with their high wages and saving habits, developed through Liberty Loan campaigns, the men have presumably more reserve capital to live on during a strike period than formerly.

Another and still more important reason for the small number of strikes has been that a reasonable wage reduction at this time is recognized as fully justifiable in view of the admitted decrease in the cost of living. That this increase is actual in spite of the persistence of some high charges, like rent, has been so clearly demonstrated as to be undeniable. Perhaps the most extended recent compilation on this point is that contained in the evidence submitted by the employing printers of New York in their recent arbitration case on wages.

Association's Publicity Section Is Doing Constructive Work

ONE of the most constructive pieces of work which the American Electric Railway Association has yet done is that which the Advertising Section of the Bureau of Information and Service is now doing. As the editors of this paper see it—and this opinion reflects the thought of many others—the Advertising Section is the correct answer to the question, "How Shall the Association Handle Railway Publicity?" In other words, the association is now organized to speak authoritatively to the public—to put the best thought of the industry into bringing out the public's problem from the public's point of view, as real news matter. And the Advertising Section is doing the job.

This section is organized for the purpose of providing a news service to newspapers and any other legitimate publicity medium in the effort to get the true story of the electric railway business before the public, for it is with the public that the railways do business, and in their hands, in the final analysis, rest the restrictions and privileges under which the railways have to work. Further, and even more important, perhaps, this section must open up the channels to these publicity mediums so that the copy is used and must establish a confidence that the material furnished is legitimate, correct and real informative news, not propaganda. Another function of the section is to make a study of possible new methods of railway publicity. The movie is one example of this, as has been suggested in these columns from time to time. And the movie has been utilized, too. The movie "news" films were busy on Electric Railway Day, May 4.

Naturally the success of any such program depends largely upon the personality of those handling the work. The important fact about the present situation is that not only has the association adopted the right method, but it has apparently found the right man to carry it out.

That the section has been accomplishing results of real value to the industry is shown by the story of its work to date, printed elsewhere in this issue. Most companies have concrete evidence of some of this work in their own local press. The work now in hand and planned for the near future is of a most valuable nature and will doubtless have a real and far reaching effect. There has been more useful railway publicity in the past few months since this section was organized than the railways have had in the same number of years, and more of it is to come.

President Gadsden of the American Electric Railway Association is appealing this week, in the name of the Committee of One Hundred, for support of the Advertising Section. While this appeal is addressed, naturally, to the members of the association, it may well be heeded by railway and manufacturer companies who are not members, for this is a movement from which all benefit directly and indirectly. The Committee of One Hundred is a committee of the industry, but naturally turns to the association for machinery and a working organization to accomplish its results. This last sentence, by the way, seems to present good arguments why all railways and railway manufacturing companies should belong to the association and take an active interest in its work.

The association needs and merits support in this publicity activity.

Peace by Understanding in the State Where People Have to Be Shown

PEACE by understanding has been accomplished in a rate proceeding in Missouri. The case was that of the Kansas City, Clay County & St. Joseph Railway. As noted elsewhere in this issue, the company was seeking a 25 per cent increase in rates. First of all a canvass was made by the company to obtain the opinion of the public with respect to the company and its service. Next the need for the increase was explained and explained so well that there was no contention against the raise as a whole. The application for the increase contained less than 1,000 words. The testimony was brief, for the need for any protracted presentation had been removed when all the different parties with axes to grind had been brought together previously and a basis was established on which proper recognition of the rights of each was secured. As a result the company has obtained its increase, the utility of the service to the community has been preserved to its fullest extent and the relations between the company and its patrons have been improved immensely through a better understanding on the part of each of the problems of the other. The settlement reached so amicably undoubtedly would have been impossible of attainment under any but the give and take attitude that was manifested after representatives of the company had pointed out wherein all stood to lose if any attempt were made by any party to the readjustment at insistence upon what it considered its inalienable rights. The story of this attainment is a concrete example of building better public relations that every one connected with the industry in an executive capacity owes it to himself to read.

Take an Active Part in Federal Government

WHAT influences a Congressman? Probably nothing else so effectively as a knowledge of what his constituents legitimately and conscientiously desire. If this is so, it is a duty as well as an opportunity to let representatives in Congress know what is desired and what is felt to be necessary. If one has any influence, he should exert it.

There are several outstanding questions today which are receiving more or less public notice, but particular attention is here called to the questions of taxation, federal reorganization and additional appropriations for certain departments to do specific work which is much needed.

This week President Gadsden spoke before the Senate finance committee with reference to public utility taxation. Ideas are only commencing to formulate on federal taxation and that question will be treated further in these columns as matters develop.

Government reorganization, however, is a vital matter already advanced considerably in congressional study and every impetus which can be given this most desirable move is worth while. The government is primarily an organization to serve the people in their daily individual and collective pursuits, but at present its cluttered up and ponderous, complex and illogical organization reduces its efficiency to an absurd point. Intelligent reorganization is needed and should be supported on the basis of grouping together those functions which are devoted to a given purpose. The administration is making an honest effort to see that it is done right and soon and needs support. The longer the organization is allowed to run as it now is the harder it will be to change it effectively, for a new administration soon gets settled in its ways.

The question of additional appropriations is a complex one and many of its angles are more political in nature than otherwise. But it is worth while pointing out the facts in connection with the requests of the Department of Commerce, which is most closely connected with the industrial and business situation. Herbert Hoover, Secretary of Commerce, has come into the Cabinet with the idea of making his department a real aid to the industry and commerce of the nation. He has called into counsel able representatives of the various lines of industrial and commercial activity and is fast coming to a conclusion as to how best the department may function to provide a service which will really aid business. He finds that, with the appropriations available for the remainder of the fiscal year, he is handicapped in, if not actually prevented from, performing this service and has asked Congress for something over $600,000 additional. In a way this $600,000 is in the nature of a capital investment, for Mr. Hoover contemplates a return of $1,500,000 from other directions if he can carry out his desires.

This request should be supported actively. Only this week Julius Kruttschnitt, chairman of the board of the Southern Pacific, points to the business depression as being beyond the state that railroad rates can affect. The point now is that Herbert Hoover has a plan to help and help quickly. Among others, the editors of business and technical papers have been given the opportunity of analyzing his requests and of cross-questioning him on his plans and methods. They are sound and practical.

Congress should be pressed to act in these matters. The way to do this is to write to the Congressmen. The time to do it is now.

Minnesota Takes a Forward Step in Electric Railway Franchise Law

IN HER new law enlarging the functions of the Railroad and Warehouse Commission, Minnesota has included a clause with reference to indeterminate franchises which should be appreciated concretely by railway companies in Minnesota, and, to a certain extent, though perhaps abstractly, by railways in other states which have not progressed so far in franchise law. The state, in Minnesota, has assumed the responsibilities which a state should assume when it starts to regulate utilities. Regulation by the state is the proper policy, but only when the state can contribute something by its regulation, and this Minnesota now does.

For the future, all railway franchises in Minnesota are, at the option of the company, made indeterminate, whether they are now term franchises or not. This applies, however, only in case the company is a Minnesota corporation. No other provisions or requirements of the existing franchises are modified. Except by future legislative action in line with the police power of the state, such indeterminate franchises may be terminated only upon purchase of the railway property by the city on one of three fair bases of price determination provided in the law.

The law is clean cut in giving to the City Council, without reference to a popular vote, the right to grant franchises. The Council also has control over service standards, routes, etc., and its decisions are not subject to appeal. The commission, on the other hand, has initial and exclusive power over fares and charges, subject only to appeal to the District Court. The commission also has supervision over security issues.

Perhaps the most peculiar—and questionable—provision of the law is that which makes all cities flat fare cities with full free transfers and retransfer privileges. This provision of the law is a formal recognition of the conviction of one large element, and probably the predominating element, of the American public that cities, at least those of moderate size, should be on a flat railway fare basis. It does, however, preclude any experiment of investigation of other means of charging for street railway rides.

Another somewhat peculiar provision is that "all cars used shall be of modern design and . . . shall at least equal in quality, style and design cars now operated in such city." It is the latter part of the quotation which particularly attracts attention, as it might be hard to tell what equality in design means.

The law on the whole, however, is an advance. Its provisions should stabilize the electric railway industry in Minnesota, for the state now practically guarantees fair treatment to legitimately invested capital. First it provides, at least by inference, that fares may be charged sufficient to yield a reasonable return on a fair valuation. Second, it makes obligatory the purchase by the city in case the city desires to terminate the franchises.

As noted last week, the Duluth Street Railway has already elected to come under the provisions of the new law. This is at least an indication of its value, as seen by those most affected by it.

Avoid a One-Sided View of the Budget System

THOSE who look upon the budget plan as merely a scheme for cutting expenses regardless of results are not aware that its function is three-sided. It acts, of course, to eliminate waste, but it also serves to encourage investment in expense-reducing equipment and to stimulate revenue production. This fact has been illustrated in several articles on budgets which have been presented in recent issues of this paper. The latest was that outlining the plan in use on the Rochester & Syracuse Railroad appearing in the April 30 issue. The plan was commented on editorially in the same issue. It is essentially like other successful plans in that it depends for its best results on co-operation, and only with co-operation can the highest degree of long-run economy be secured.

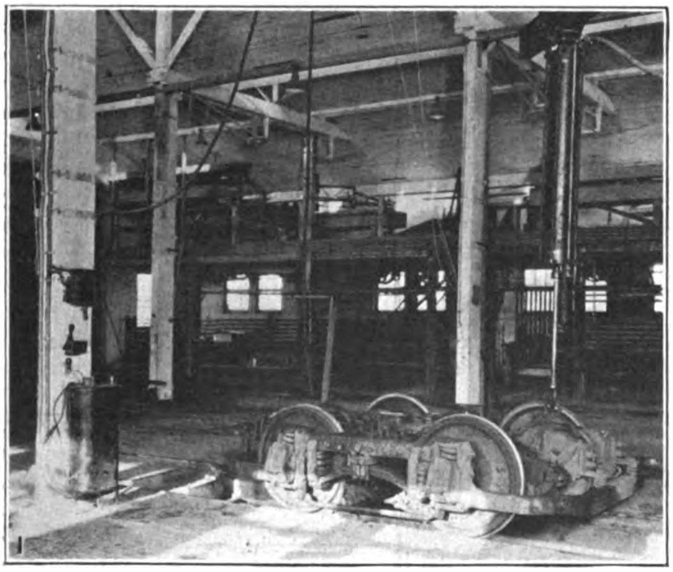
These remarks are prompted partly from observation of the inability of some department heads to get the money for equipment and construction which will surely pay by returns on the investment. The answer is usually: "You have proved your case, but we haven't the money"; and this answer, unfortunately, is often correct. But if an expenditure will pay a return of, say, 25 per cent on the investment, it ought to be possible to get the money. The budget will help to do it by insuring the best possible distribution of available funds and by demonstrating the necessity for getting in more revenue. Under a system, or lack of it, by which the several departments are not kept informed of all details of the finances, each head is apt to push for all he can get, regardless of the effect on others. A good budget plan eliminates this.

Quotation from the Federal Electric Railways Commission Report

No. 20

TO A degree unknown to private business enterprises, which to a certain extent are able to finance capital expenditures from earnings, the electric railways are dependent upon new investment—new capital—for the extension, improvement and betterment of the service which they perform. Communities need and are constantly demanding additional local transportation facilities. They require large sums of money, which can only come from those with savings to invest. When the flow of new capital ceases, when the confidence of the investor in the ability of the enterprise to safeguard the integrity of the investment and to insure a fair return thereon ceases, new capital is unobtainable and the utility can no longer serve the purpose for which it was created. This condition is now present. Lack of confidence in electric railway investment exists today to a degree which has caused a partial paralysis, is working havoc with the finances of the companies and is depriving the public of the service to an alarming extent.

Former Horse Barn Makes Good Shop Building in Calgary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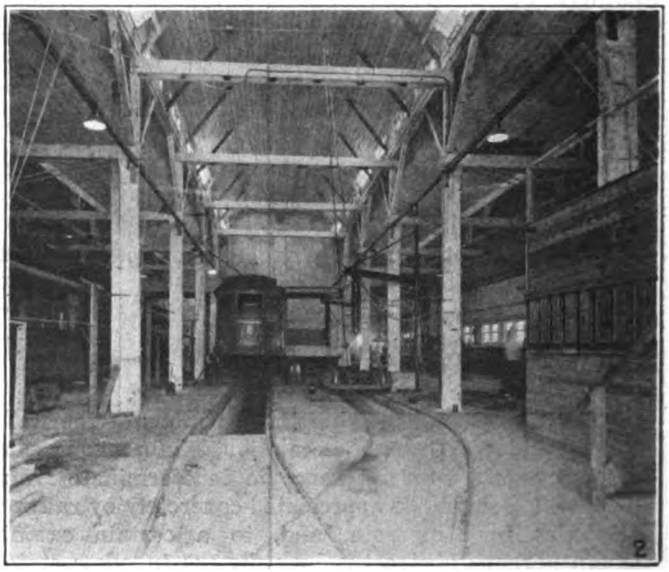
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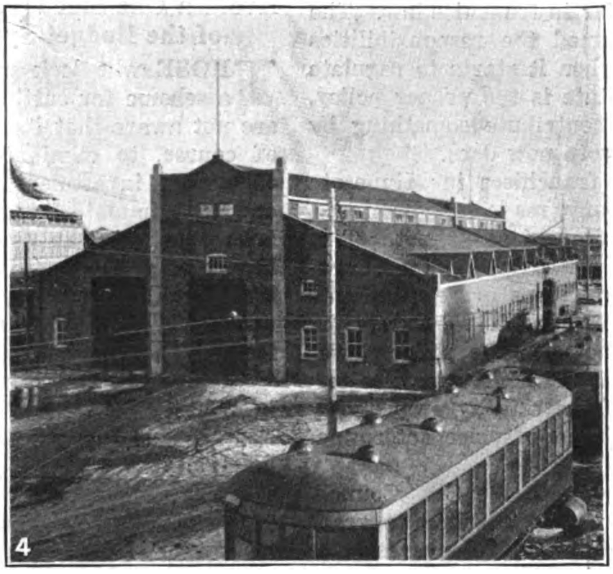
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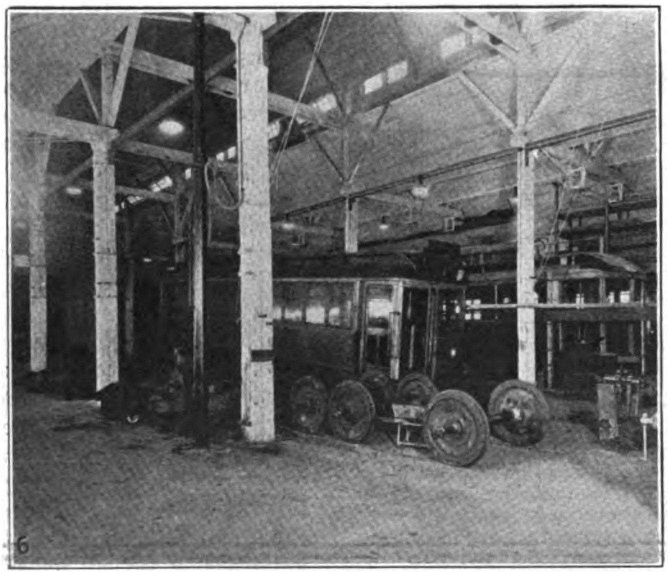
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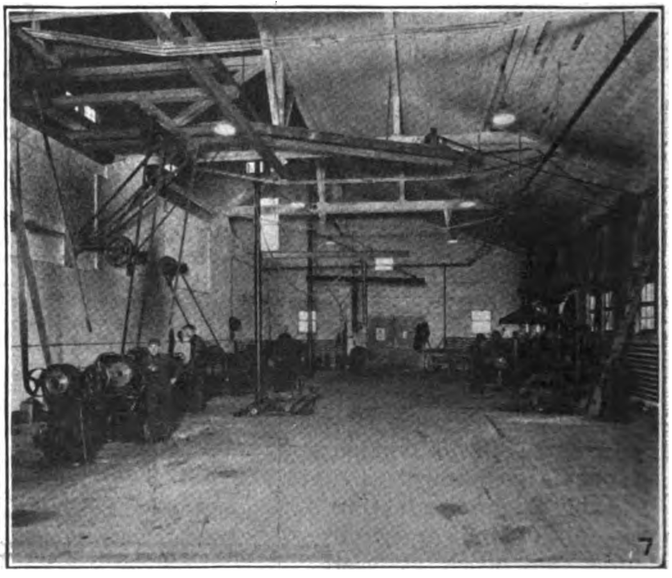
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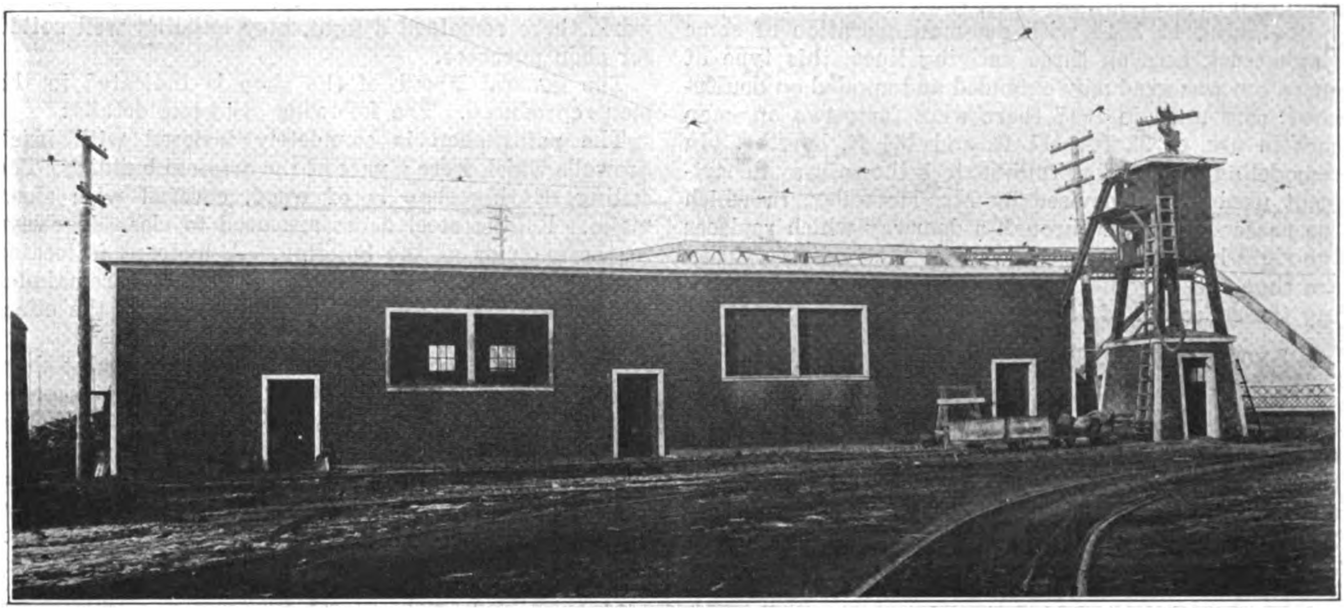
1. Air hoist and arrangement for operating trucks under their own power.
2. General view of Calgary shop.
3. Construction view of shop steam pipe line.
4. Shop building Calgary Municipal Railway.
5. Expansion bend in shop steam line.
6. This is a glance at the truck section.
7. Machine shop is roomy and cheery.

Recent Developments at Calgary

A Shop Evolved from a Horse Barn; an Attractive Resort, Bowness Park, and a Convenient Sand and Fuel House Are Among the Outstanding Physical Improvements on This Alberta Municipal Property



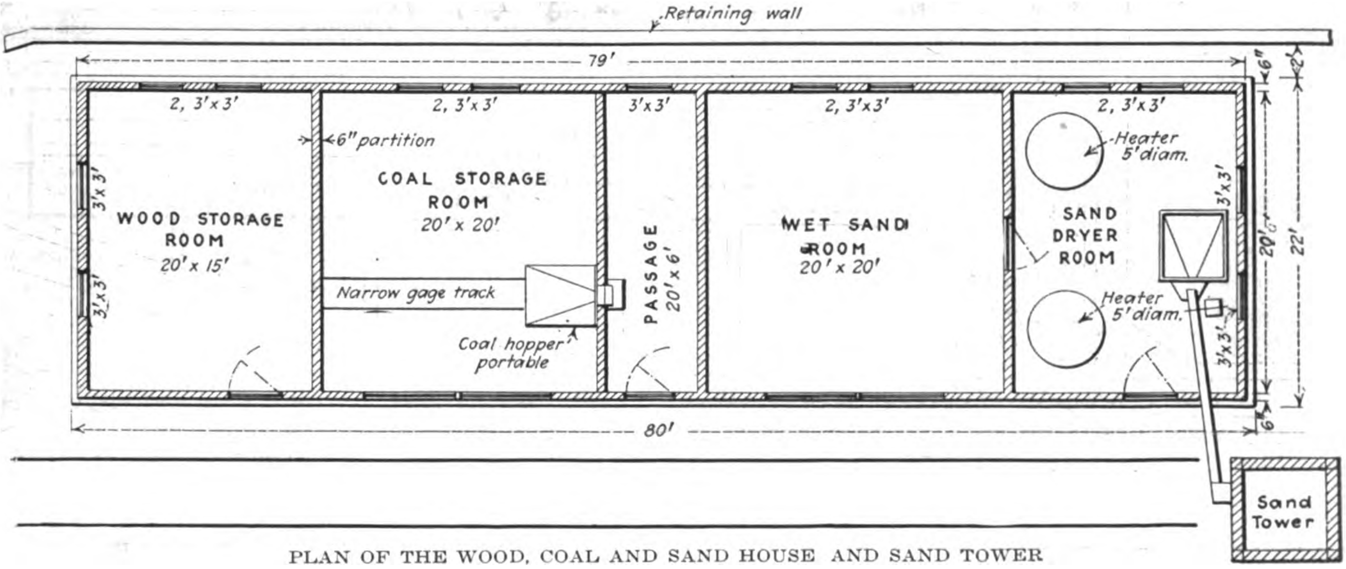
COAL, SAND AND WOOD STORAGE BUILDING, WITH SAND TOWER AT RIGHT

THE Calgary Municipal Railway operates 83 miles of track in a city having a population of more than 75,000, which is spread over an area of 40½ square miles. The population density is low, rendering the furnishing of profitable electric railway service a matter of some difficulty.

The electric railway department is at present combined with the lighting department under the immediate direction of R. A. Brown, who has the title of general superintendent of electric light and railway departments. The two departments were combined after the resignation of Thomas H. McCauley as superintendent of the railway department early in 1920. Mr. Brown reports to Commissioner A. G. Graves, one of the three commissioners who look after the city government, the other commissioners being the Mayor and the commissioner in charge of public works. Mr. Graves has supervision of public utilities.

Calgary, like other cities in western Canada, was overbuilt during the boom years between 1909 and 1913, and the electric railway service was correspondingly expanded in the expectation of a continuation of the expansion of those days.

The war brought a tremendous reaction. As reflected in the electric railway traffic, the reaction was indicated by a falling off in numbers of passengers carried annually from 24,000,000 in 1913 to 17,500,000 in 1916. In 1920 the number carried was 17,091,356. During the


Retaining wall
79'
6"
2'
2, 3'x3'
2, 3'x3'
3'x3'
2, 3'x3'
2, 3'x3'
6" partition
WOOD STORAGE ROOM 20'x 15'
3'x3'
3'x3'
COAL STORAGE ROOM 20' x 20'
Narrow gage track
Coal hopper portable
PASSAGE 20' x 6'
WET SAND ROOM 20' x 20'
Heater 5' diam.
SAND DRYER ROOM
Heater 5' diam.
3'x3'
3'x3'
20'
22'
6"
80'
Sand Tower

PLAN OF THE WOOD, COAL AND SAND HOUSE AND SAND TOWER wartime slump the railway found itself with more track and cars than it needed. There was also a critical shortage of men to operate the system. This situation was met by the changing over of the cars to one-man operation under the direction of Mr. McCauley. This change was so significant that it deserves now a few words of review in the light of the intervening progress in this line that has been made. The situation was described at the time in an article by Mr. McCauley, published in the Sept. 22, 1917, issue of this paper.

Beginning in 1914 with one-man operation of some single-truck cars on three outlying lines, this type of operation was gradually extended and applied on double-truck cars until in 1917 there were forty-two one-man cars in use, of 32 ft., 41½ ft. and 46½ ft. lengths. In remodeling the existing rolling-stock the railway department used a plan devised by Mr. McCauley, in which the passengers enter through a doorway which replaces the right-hand panel of the front of the vestibule. They are thus faced by the operator as they enter, facilitating the collection of fares.

SHOP FACILITIES RECENTLY GREATLY IMPROVED

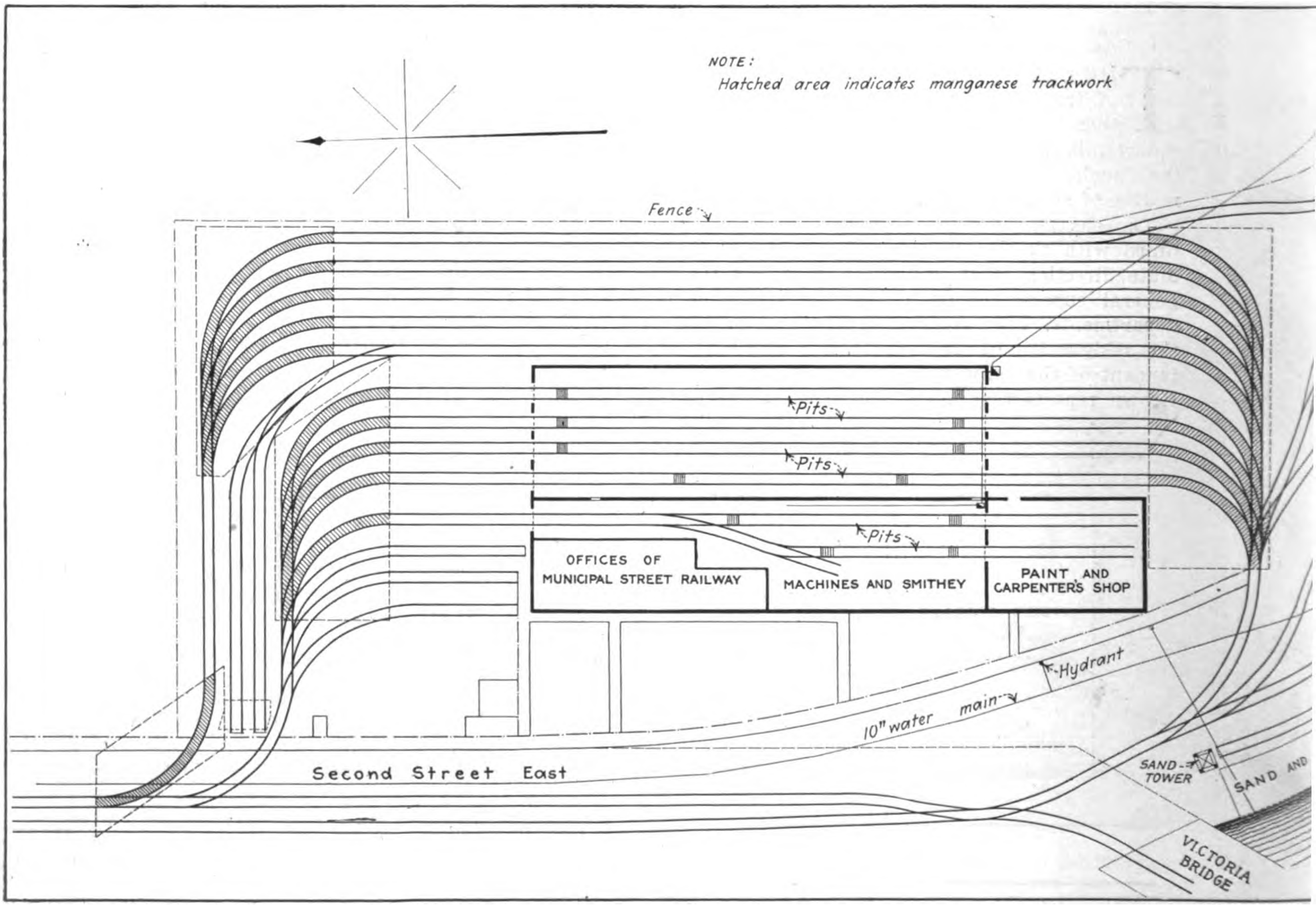
With the above few historical data as a background, it will be of interest to note the most important of the recent developments on this municipal property. After the armistice was signed, Superintendent Brown was able to secure for the railway department a building formerly used as a stable for the city public works department. It was located near the former overcrowded carhouse, shop and office building, as is shown in an accompanying plan.

The shop building is of brick and frame construction, and it formerly contained two floors. The lower floor was used as a stable and the upper as a hayloft. In the reconstruction the second floor was removed and wooden trusses were installed to support the roof. The material reclaimed furnished nearly enough lumber to make all of the alterations. The windows in the side walls were enlarged also and, after completion of the work, there remained a light, airy building well suited for shop purposes.

The general layout of the shop is indicated in the plan reproduced. The following are some details:

The paint shop is completely inclosed with brick firewalls which were a part of the original building. The ceiling of this shop is of wood, covered with sheet metal. Rolling steel doors are used to close doorways in the exterior of the building. A hydrant is located in this shop for fire protection so that the remainder of the building is fairly well protected from the effect of fire which might arise in the paint shop.

The machine shop is located alongside the paint shop. This contains a corner for the blacksmith, this corner being furnished with a forge, a mechanically driven hammer and other miscellaneous forging equipment. There are also here a large wheel lathe, a hydraulic press, a machinist's lathe, a pipe-and-bolt cutter, an emery wheel stand, a drillpress, a hacksaw and a babbitting bench.



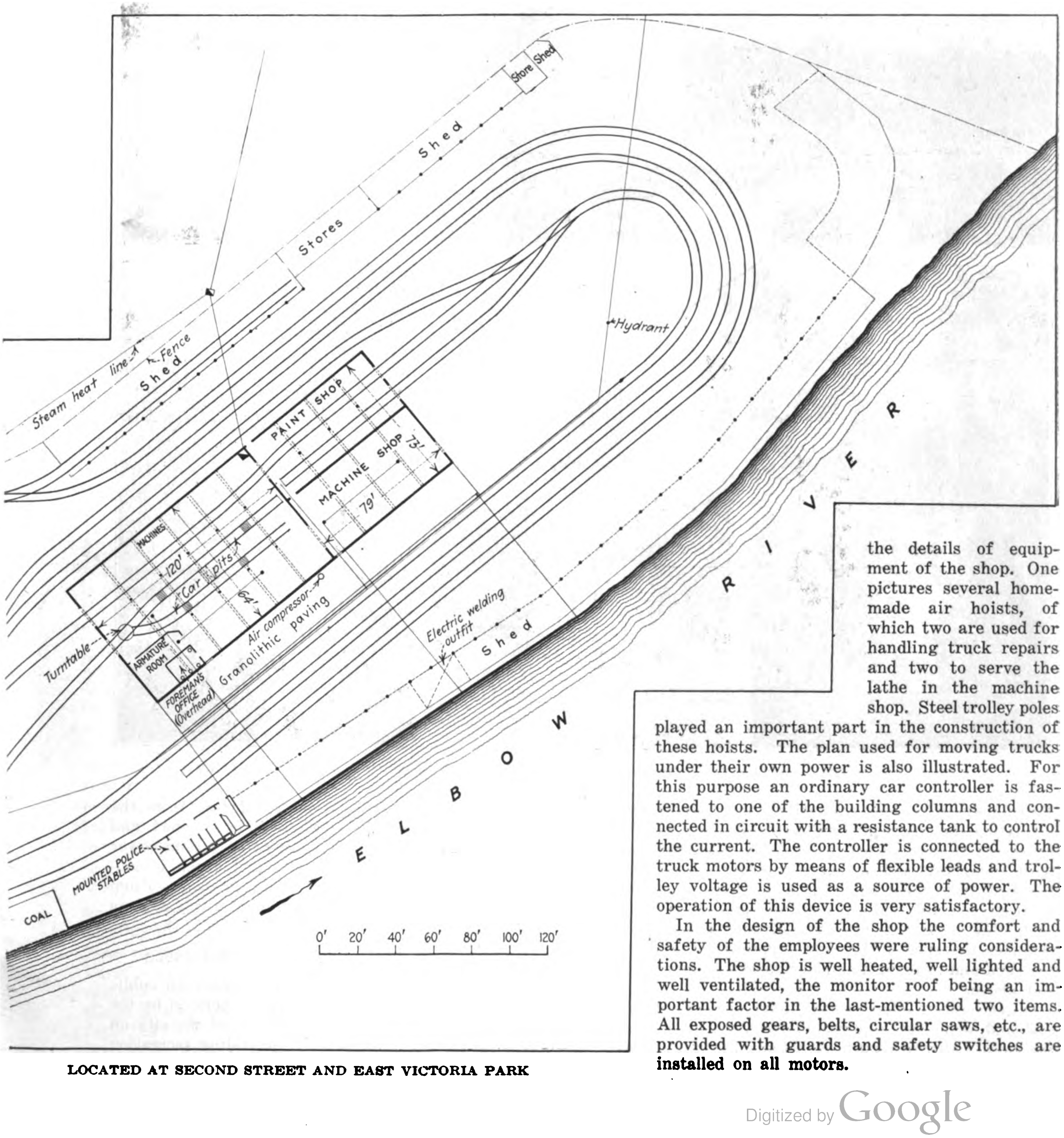
LAYOUT OF CALGARY MUNICIPAL RAILWAY'S SHOP, OFFICE AND CARHOUSE PROPERTY.

The carpenter shop is provided with a balcony which furnishes a convenient support for the shafting for the heavy machines placed on the main floor. Above the balcony are a few woodworking machines, several benches and a lumber drying rack.

Opposite the carpenter shop is the truck repair shop, together with air compressor and controller repair benches. This shop contains also an air compressor of a capacity of 50 cu.ft. per minute with a receiver located out of doors.

The front end of the building contains a toilet room and an armature room with office and storeroom above. The armature room is provided with a monorail hoist for handling armatures. It is planned in the future to install also a Universal armature machine in this room. Here is also located a Century electric armature and field tester. Insulation tests are made by applying the trolley voltage of 550 to the armature.

Considerations of economy made it necessary to use wooden doors covered with sheet metal in the front of the building, although it was realized that these are more difficult to handle than the rolling steel doors used elsewhere in the building. In addition to the lower cost, the heat non-conductivity of the wood was a factor in heat conservation, which is considered to be a very important matter in a climate as cold as that of Calgary.


Store Shed
Shed
Stores
Steam heat line
Fence
Shed
Paint Shop
Machine Shop
73'
79'
Machines
120'
Car pits
64'
Turntable
Armature Room
Foreman's Office (Overhead)
Air compressor
Granolithic paving
Hydrant
Electric welding outfit
Shed
Mounted Police Stables
Coal
Elbow River
0' 20' 40' 60' 80' 100' 120'

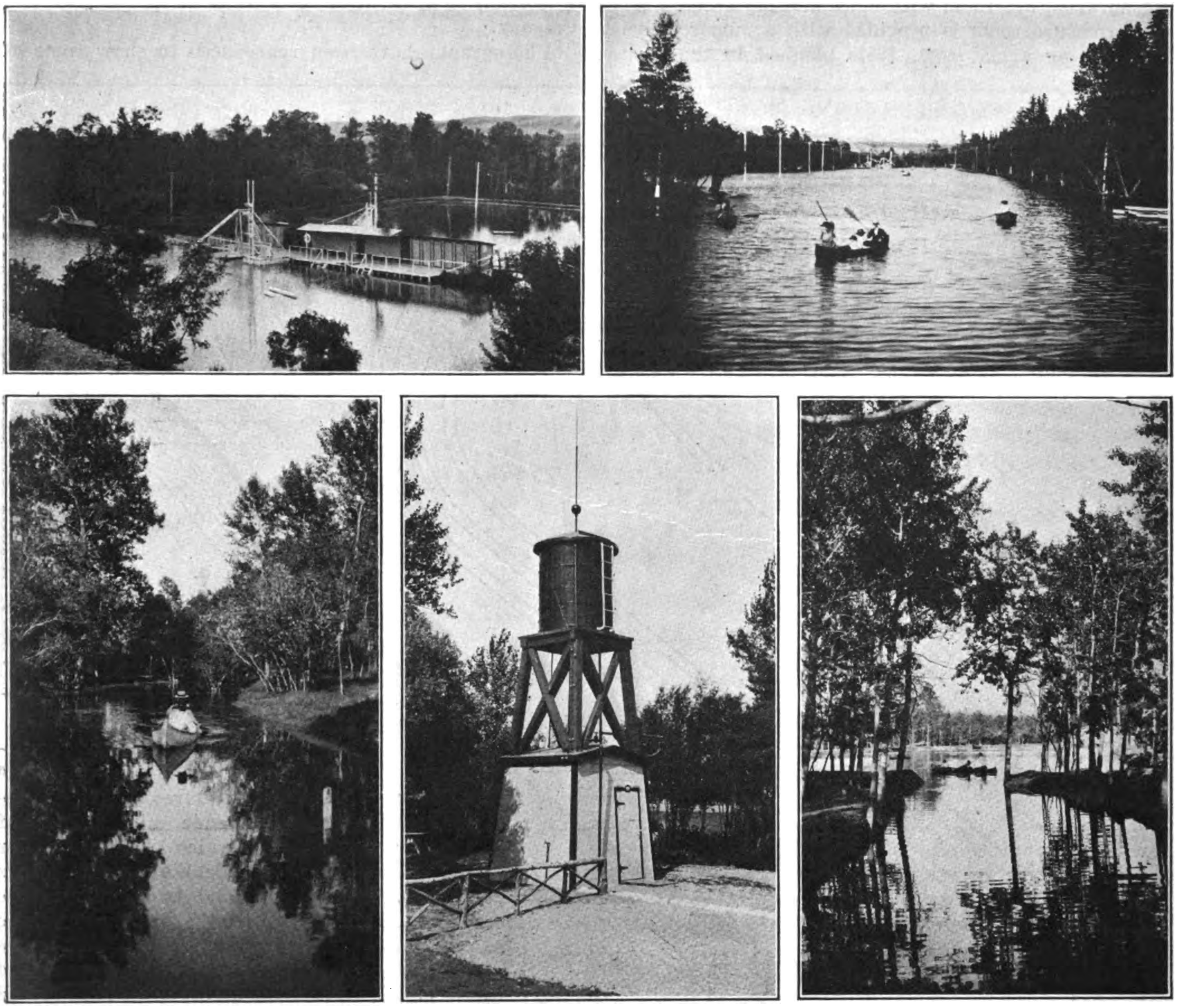
LOCATED AT SECOND STREET AND EAST VICTORIA PARK

Photographs have been reproduced to show some of the details of equipment of the shop. One pictures several home-made air hoists, of which two are used for handling truck repairs and two to serve the lathe in the machine shop. Steel trolley poles played an important part in the construction of these hoists. The plan used for moving trucks under their own power is also illustrated. For this purpose an ordinary car controller is fastened to one of the building columns and connected in circuit with a resistance tank to control the current. The controller is connected to the truck motors by means of flexible leads and trolley voltage is used as a source of power. The operation of this device is very satisfactory.

In the design of the shop the comfort and safety of the employees were ruling considerations. The shop is well heated, well lighted and well ventilated, the monitor roof being an important factor in the last-mentioned two items. All exposed gears, belts, circular saws, etc., are provided with guards and safety switches are installed on all motors.

The shop department has made an excellent start in the direction of electric welding, a special booth out of doors having been provided for that purpose. The location of this is shown in the plan. Here worn-out gear cases, broken castings and other parts are repaired, and the welding outfit is also useful to the track department in building up cupped rail joints.

A large saving was made in the heating of the shop by connecting it by means of a well-insulated pipe line with the municipal power plant located 2,000 ft. away. Two illustrations show respectively the method used in insulating the steam pipe and in installing a horizontal gooseneck to take up expansion. The pipe, surrounded with a magnesia and tar paper covering, is laid in split tile directly in the ground and at an unusual depth, out of respect to the soil-penetrating qualities of winter's cold. The gooseneck is in a two-division concrete-walled chamber, designed in this way to permit deformation of the bend and to furnish ample support for the cover and soil above.



VIEWS IN BOWNESS PARK, WHICH DEMONSTRATE THAT MUCH HAS BEEN MADE FROM LITTLE

On account of climatic conditions large quantities of coal and wood are required in the winter for heating the cars, for which purpose hot air heaters are used. It is necessary also to store a great amount of sand because of the difficulties of securing sand in the dead of winter. Mr. Brown has, therefore, given special attention to the design and construction of a building for the storage of these necessities and for the drying and delivery of the sand. The plan of the building is shown on page 887. It provides bin capacity for storing about 100 tons of coal and 120 tons of sand.

In the coal storage room is located a hopper, mounted on trucks, and bags are filled in the passageway from this hopper. Sand is dried with natural gas heaters in the sand-drying room. It is transferred from the heaters to a concrete hopper, where it is screened, and is then elevated by a bucket conveyor to a sand tower which has a small storage capacity and which is conveniently located for a supply of sand to the cars. From the tower the sand drops by gravity, and a rubber hose is used to direct the flow into the sand boxes in the cars.

BOWNESS PARK IS ATTRACTIVE AND PROFITABLE

The city of Calgary is not well provided with public parks, so that the park maintained and operated by the railway department, about 7 miles west of the city on the Bow River, is a real factor in providing recreation for Calgarians. The accompanying group of typical views in the park furnish all needed commentary upon the success of the railway department in building up an attractive resort. From these pictures it is difficult to realize that this attractive park is almost entirely artificial, much ingenuity having been expended in diverting water from the river and directing and impounding it by means of dikes. The waterways were fixed up to provide boating and bathing facilities for the railway patrons and every effort was made to provide for the general comfort of the public. The catering privileges in Bowness Park are leased out for $3,500 per season. Round-trip tickets to the park are sold for 20 cents, and a considerable source of income for the railway department has thus been created.

Gasoline Motor Driven Car Tried

A CAR propelled by a gasoline motor and designed to supplant branch line trains and interurban electric cars is being exhibited and operated in St. Louis, Mo., by the Bowen Motor Railways Corporation of St. Louis. The car is being operated daily from Union Station, St. Louis, traversing the Creve Cœur branch of the Missouri Pacific Railway to Creve Cœur Lake. The actual running time for the round trip, a distance of 40 miles, is two hours and thirty-four minutes. About 5½ gal. of gasoline is consumed, which is an average of about 7 miles to the gallon.

The motive power of the car is a 50-hp. gasoline motor, which is slung in front of the body of the car and has a hood covering similar to that of an automobile. The car has a drive shaft like that of a motor car and the power is conducted to the rear wheels through a differential.

The body is similar but shorter than the ordinary electric car. It will seat thirty-five persons and the engine has enough power so that a trailer can be attached if necessary. Electric lights and hot water heat are part of the equipment.

Electrification Progress in Brazil

ELECTRIFICATION in Brazil is expected to take on considerable activity this year. A recent report in the *Wall Street Journal* states that a bill authorizing the first step of the electrification of the government-owned Central Railway of Brazil has been passed by Congress and a decree to that effect has been issued by the President. The first step includes electrification of numerous suburban lines out of Rio de Janeiro and lines running into Sao Paulo. An expenditure of an amount equivalent to about $10,000,000 under normal rates of exchange has been authorized. A year ago the Brazilian Congress voted $500,000 for an extensive survey. This will be the second large electrification project undertaken in Brazil. The other is the electrification of 28 miles of the Paulista Railway, begun last summer and to be completed about June, 1921.

During the war work on extensions of the Metropolitan Underground Railway in Paris practically ceased because of the scarcity of labor. Later financial conditions forbade much new construction, but reports from Paris indicate that an extension of line 7, in some respects the most interesting of any from a constructional standpoint, is now being completed. It extends from the Palais Royal under the Louvre and then along the river bank to the Hotel de Ville.

Omissions in Inventories

A Carefully Conducted Appraisal of an Electric Railway Property Made Recently Disclosed Omissions in Previous Appraisals Amounting to 7.75 per Cent of the Total Valuation

By Leslie F. Van Hagan
Professor of Railway Engineering, University of Wisconsin

THE term "inventory," as used herein, means the listed items of physical property that make up a plant. In making an appraisal, the first thing to do is to list all physical property. Those who are familiar with appraisal work know that the chief difficulty in preparing an inventory is to find all of the property. The errors of inventory are usually errors of omission. Engineers recognize this condition and provide for it by adding to the value of the property an amount which they consider sufficient to cover "omissions and contingencies." It is usually computed as a percentage of the value of the property. It should be understood, also, that the omissions which the engineer attempts so to cover may be omissions in pricing as well as omissions in inventory.

Just how much of an allowance should be made to cover this item has been a matter of pure speculation. So far as the writer knows, no actual statistics have been brought forth at any time in support of the various allowances that have been used. The allowances have been "guessed at" and supported by the test of "reasonableness." Under existing circumstances that is about all that can be done, but obviously it would be desirable to have concrete information on this point. The purpose of the present article is to contribute a bit toward the accumulation of such information.

The writer was recently called upon to review appraisals of the same street railway property that had been made by the same public utilities commission at periods several years apart for the purpose of determining the reason for certain apparent inconsistencies. It was evident that increases in the appraised value of the property would arise from some or all of the following sources: (1) Additions to the property; (2) increases in unit prices; (3) increases in overhead allowances, and (4) more careful inventorying that would reveal hidden quantities. Without going into detail about methods, it may be simply stated that it was finally determined that there had been an increase in the latest inventory, arising from more thorough inventorying, that amounted to 7.75 per cent of the physical property that had existed at the time of the preceding inventory. That is to say, the evidence was that the earlier inventory showed only 92.25 per cent of the property that the later inventory showed was in existence at the time the earlier inventory was made.

This figure of 7.75 per cent is somewhat startling. The writer knows of no appraisal made by a public utilities commission in which so high an allowance for this item has been allowed to stand. On the other hand, he knows of no previous attempt to determine definitely what degree of accuracy is actually attained in inventorying property. The allowance percentages that are used are largely matters of custom and are copied from one appraisal to another. An allowance of 2 or 3 per cent has been commonly used by state commissions.

There can be no denying that the degree of accuracy varies for various inventories. Even if 3 per cent be accepted as a fair average allowance for "omissions and contingencies" it is to be expected that, in some cases, the actual percentage will be higher and in some cases it will be lower. In other words, the conditions under which an inventory is made will affect its accuracy. It is of interest, therefore, to note the conditions under which these inventories were made.

CONDITIONS UNDER WHICH THE APPRAISALS WERE MADE

There have been three appraisals of the property in question, one in 1907, one in 1910 and the latest in 1914. In all three the street railway company and the commission co-operated in varying degrees. In preparing the 1907 inventory it was originally agreed that the inventory would be furnished by the company and priced by the commission, but the company was so slow and indifferent that the commission had to do a large portion of the inventorying. The president of the company stated frankly that he regarded the appraisal as being intended for taxing purposes, and the company representatives guided themselves by his attitude. The company was in a better position than any outsider to inventory the property, and without the company's complete co-operation the work proceeded under a decided disadvantage. The resulting appraisal was obviously faulty and was soon superseded by the 1910 appraisal.

When the 1910 appraisal was made the question of rates had become predominant and the company's policy had begun to change in the direction of securing as high a valuation as possible. There was greater co-operation between the company and the commission in preparing this inventory, but they did not work under a thoroughly planned scheme that fixed definitely the activities and responsibilities of each party. The commission depended largely upon the company for the inventory, but the company had not yet reached a full appreciation of the importance of making a complete inventory nor the fact that it would have to organize especially for the work. Regular employees were called upon to devote to the inventory such time as could be spared from their regular work, with the result that the inventory received secondary consideration. The commission's engineers supplemented the company's efforts. They had access to company records, but the records, particularly for property acquired many years before by purchase, were not all that could be desired. There was not time to make thorough field surveys, so various short cuts and approximations were necessarily used. It is not surprising, therefore, that the result was imperfect.

The rate question continued to increase in importance, and the company finally awoke fully to the fact that it was to the company interest to have a complete inventory of the property. After some consultation with the commission's engineers and statisticians, the company began to make such an inventory. An organization was set up which developed as the work proceeded until it assumed fairly large proportions. Field parties were sent out, and, at the same time, company records were searched for information that would throw light upon the task. When the inventory was complete it was turned over to the commission's engineers to be checked and priced. The commission's engineers checked approximately 10 per cent of the company's inventory upon the theory that a 10 per cent check would reveal the degree of fairness and accuracy of the company's work. Whenever, in the case of a given item, the check proved unsatisfactory a more complete check of the item was made. Where it was possible to do so, the 1914 quantities were compared with the corresponding 1910 quantities and the differences were satisfactorily explained or corrections were made. The two sets of engineers—those of the company and those of the commission—worked upon the principle that inventory quantities are matters of fact about which there should be very few differences of opinion. In general, the company's work proved to be fair and accurate. In spite of the careful work of the company in making the inventory, it cannot be claimed that it is perfect. The company learned many things about inventory methods during the progress of the work that it would undoubtedly use to advantage if it were to make a new inventory.

GRADING, LONG FORGOTTEN, HAD BEEN DONE

Although the indications are that much property included in 1914 was omitted in 1910, it is not possible to point out exactly what the omitted items were. All that can be stated definitely is that the property shown in the 1914 inventory was actually there. Some few of the omitted items, however, can be identified. For example, a search through old franchises and deeds revealed a number of places where the company had been obliged to do grading that would not be picked up by a field inventory party. One such piece of grading contained nearly 140,000 cu.yd. of material. Again, the company investigated a number of heavy embankments on its interurban lines, where records showed that there had been trouble from settlement during construction. A well-drilling outfit was used and holes were bored through the embankments in a number of places. About $150,000 worth of hidden grading material, not included in the 1910 inventory, was discovered and added. These instances are offered not only to illustrate why property is sometimes overlooked but also as a sidelight upon the efforts that were made in 1914 to find all existing property.

The writer is not interested particularly in seeing a higher figure established for the allowance for omissions. As an engineer he is not ready to admit, until confronted by convincing data, that it is impossible to attain a 97 per cent result in inventorying. Inferentially, the smaller the allowance an engineer makes for omissions the higher is the quality of his work; engineers in the employ of state commissions are going to keep the figure for omissions as low as possible. At the same time it seems evident, from the facts here presented, that there may be justification for breaking away from the figure of 3 per cent when conditions make it seem advisable. If we accept a 3 per cent allowance for omissions in inventory and pricing as an average figure (perhaps it should be considered the minimum figure), variations from that figure should be permitted whenever the conditions that surround the making of the inventory justify them.

Without doubt there are figures in the possession of various state commissions that would establish the limits within which the allowance should vary. It would not be difficult to make studies similar to that upon which this paper is based, and the information would be well worth the trouble.

Engineer vs. Auditor in Cost Keeping

A Conference of These Department Heads with the General Manager Brings to Light the Common Controversy and Points Out the Moral in an Interesting Colloquy

By E. A. W.

"WHAT does this mean, $14,000 for an extension of our 60,000-volt transmission line up Dry Creek and we are going to abandon that line next year?" It was the general manager talking, and he had the chief engineer seated before him. "You told me before you started the job it would not run over $10,000."

"We based our estimate on figures given us by the cost department," replied the chief engineer. "To be sure we didn't go into details. You were in a hurry and we supposed the cost department figures on the Bear Cañon extension would be close enough. The two extensions are almost identical."

The general manager, or "old man" as he was popularly called, sent for the auditor. Upon his arrival he went into executive session on the subject of costs, cost-keeping, cost analysis, and proper preparation of estimates, with the chief engineer and auditor.

There were many opinions and thoughts uttered. The auditor got his back up at one stage of the game and declared his department should not be held responsible for detailed cost data, that the compilation of such information was an engineering function. This argument was joyfully received and acquiesced in by the chief engineer. The general manager threw a bucket of ice water on the proposition by declaring that cost data, to be of value, must check precisely with the general books, and he was agreeable to the cost records being kept by the engineering department provided the auditor would vouch for their accuracy and be willing to take the stand before a court or the utilities commission and swear to values by quoting and use of such data.

It is needless to remark that the auditor failed to agree to any such arrangement, but the general manager's proposition placed the thing in a new light. It brought out the indisputable fact that cost records to be of value and free from attack must balance with the general books.

"What do we want cost data for anyway?" suddenly asked the G. M. "I'll bet each one of us has a different reason." The auditor spoke first: "I'm not so much interested in detailed costs and quantities as I am in totals. As long as I can keep my books straight as regards additions to property and retirements of property, and not mix construction and maintenance, I'm satisfied."

COSTS FROM THE CONTROL STANDPOINT

"I need to go further than that," volunteered the engineer. "I want detailed data for estimating purposes and to check against quotations from contractors and firms doing work for us. I need costs and quantities in quite considerable detail to enable me to prepare my monthly and yearly budgets."

"Your needs are important and coincide with mine to a certain degree," said the G. M., "but I go you a step further and will probably surprise you when I say costs are of paramount importance from a control standpoint and you have both overlooked what to me is their major value."

"Control standpoint!" both the auditor and engineer unisoned, "what have we been talking about?"

The G. M. smiled. "To bring out my point, will you both agree that as our cost estimating works out at present we use it mainly for post-mortem analysis? We can very profitably use it to predict or pre-plan with. As an illustration of what I mean, you, Mr. Engineer, can lay out on paper a proposed transmission line, tell exactly the size of copper wire needed to carry a given amount of electrical energy to a certain point. You know in advance what your electrical losses will be and just how far apart the wires must be placed to avoid short circuit. You can figure to within one of the number of poles needed, and just what additional electrical load your generating plant will have to supply. If the generators are not of sufficient electrical capacity to supply the additional energy needed, you can lay out on paper a new generator and tell before a single workman has started its construction just what energy you will get from it; and furthermore, its efficiency. A navigator can lay out his course while in port and follow it on the high seas until it finally takes him into the port of destination. Don't you see it now, the electrical engineer and navigator can tell accurately in advance just what the results of their calculations will lead them to, and by mathematics find out the most efficient design or most expeditious course to follow?"

"Yes, but don't we also use cost data for the same purpose?" spoke up Mr. Engineer. "We make out our cost estimates in advance of a job."

"To be sure you do, and always allow a good margin for contingencies," said the G. M., "and how often do you put in revised estimates when a job is half way along? I would like to see cost data used scientifically to plan a job. By such use we should be able to predetermine methods and results from a cost standpoint as well as we do now from design."

"I see where I have got to change my viewpoint," said the auditor. "My training for years has been along lines of investigation and audits."

"No, I don't agree that you should change your viewpoint in the least, Mr. Auditor, but you can, with considerable profit to yourself, enlarge it. For years your training has been balancing income and outgo, debits and credits, as well as balance sheets for a busy directorate and the treasurer. Physical quantities and their value, labor hours and production per labor hours, changes in methods and ensuing results have made impressions but have been pushed aside for debits and credits and balance sheets."

"You're right, G. M.," and the engineer pounded the table before him. "At the last meeting of our Engineering Society almost an entire session was devoted to lambasting accountants for not revising their ancient methods of cost accounting. Solomon's bookkeepers used the same general scheme when the temple was built that most accountants have today, and like Masonry, it has been handed down intact through the ages."

"I seem to be getting mine at this pleasant little knocker's convention," crisply interjected the auditor. "Well, go as far as you like. I'm here to learn, but Mr. Engineer, don't throw out your chest with righteous indignation and imagine yourself the most abused person on earth. If I recall correctly, you seemed satisfied with things when we started this conflict. Let me say, however, while I have the floor, that under our present method of cost accounting a great part of the accuracy of our records devolves upon your organization. For example, if you can't get your foremen to turn in proper time cards and quantities used, what can my cost clerks do?"

"Righto," came back Mr. Engineer friend. "We have not been as careful or strict as we should have been, but now that the subject is opened up, I'd like to say that my field forces are hired to use tools and not to push pens and pencils. I want to say also that cost reports mean nothing in my pure young life but a check against estimated costs. I haven't the time to study the detail sheets, new estimates require all my attention. I wish we could revise and better our methods of making up estimates so they would be more complete."

"You fellows seem to be working up to the point I am striving for, and that is to reduce the clerical work of our supervisory staff and field forces to an absolute minimum, and at the same time secure the maximum results from a cost control standpoint. To accomplish these two results our cost department must give more attention to its work than ever before, for we will look to it for control. Today the auditing department and engineering department pass the buck to each other whenever a question arises."

The manager reached in a drawer in his desk and pulled out a bunch of estimates, or work authorizations. Turning to the chief engineer, he said: "Here is a job showing a probable expenditure of $8,000 for a new transmission line to the Hurricane Coal Company's property. No doubt the quantities shown are fairly accurate, but what did you base your labor costs on?"

"I presume the superintendent of lines followed his usual custom and guessed so many men for so many days, digging the dope out from the experience file he carries on his shoulders."

"Just so, all right. Now suppose when you first learned that this line was to be built you had given the cost department the size of wire needed, type of insulation, hangers, cross-arms, height of pole, length of line, all on a blueprint, with special reference to any unusual matters not ordinarily encountered, and they had shortly thereafter handed you a complete itemized estimate, what would you do?"

"Say, Boss, I'd throw a fit," the engineer laughed, "and after I had come out of it, I'd say the estimate was crazy and, without wasting time to look it over, have the line department make a real one."

"Well, now, suppose some more," continued the G. M. "Let's assume the estimate was correct, more so than many an overworked superintendent could prepare. Would not such knowledge be of greater value to you than all the post-mortem cost analysis made up?"

THE ENGINEER AND AUDITOR SEE THE POINT

The chief engineer was thinking and thinking hard; he had the light of a new idea in his eyes; even the grizzled old auditor was doing some. The latter was aware of the oft-repeated complaints of his cost clerks that the operating heads did not make use of the carefully detailed and elaborate cost statements issued from their department. It was dawning on the auditor that it was a proper function of the cost department, rather than that of the operating department, to analyze and question.

The discussion between the general manager, auditor and chief engineer gave each one a new perspective. The engineer saw the relation of cost preparation to design. The auditor saw a neglected function, which, properly set in motion, would make his department a greater help in administrative control, and at the same time insure more accurate bookkeeping. The general manager visioned greater operating efficiency and control through direct comparison of statistics prepared by an unbiased, disinterested, organization.

To be sure the engineer wondered if adopting such methods of cost estimating would not result in endless explanations, but the opportunity of securing cost data carefully prepared and showing comparisons offset the thought. He was interested in output per labor hour more than in cost per unit.

The general manager knew a new day in cost accounting was dawning, when methods and results would be firmly bound together, inefficiency in the first quickly shown in the second, where idleness, lost time, inadequate machinery, inefficient working forces, lack of facilities, would show up promptly. He knew that the determination of costs in advance, instead of piling up complications of past results, gave him a better grasp on causes, which is the main idea in control.

It was gradually dawning on the auditor that his cost system was woefully lacking and incorrect in its application, that cost statements were not being analyzed with the idea of reducing wastes, but rather as an index of the guessing ability of the estimator. He understood that before any job could be started somebody had to outline why it was necessary, what was to be used, where it was to be used, when it was to be used, how it would be done. But his job would be to show if the job was warranted in view of its cost, and this big "if" should be known before and not after the work was started.

White Line Shows Swing of Cars

IN THE heavy traffic sections of Youngstown, Ohio, the local police department has had white lines painted on the pavement to indicate the clearance necessary for the swing of the street car platforms. These lines are a great help, it is claimed, in preventing collision of the cars with pedestrians or automobiles. However, in connection with the use of these lines, it is pointed out that they serve simply in the nature of a warning to the driver of an automobile or a pedestrian and help him in making sure that he is in the clear. The presence of the line does not absolutely prevent an accident and in no way relieves the street car man of his share of responsibility.

Selling Rides in a City of 6,000

Interesting Experiment During Nine Months of 1920 in Selling Twenty-five Tickets for $1 at Nelson,
British Columbia, Pushed by Woman Chairh Fare Bringing Less Today—High Per-
Board of Aldermen—Straight 5-Cent Casman of Street Railway Committee of the
centage of Grades and Curves Has a Tendency to Discourage Walking

VIEW OF NELSON ON KOOTENAY LAKE

NELSON, British Columbia, with its population of 6,000 and a street railway of but 2.5 miles route (4 miles single track in all), does not seem at first blush likely to offer any experience in the matter of selling electric railway transportation. Nevertheless, the very fact that no healthy persons in Nelson (and most of them are healthy) have to use the trolley gives point to the experiment made by this municipally owned road. A rather high percentage of grades and curves is about the only thing to discourage walking.

The earliest fare prevalent on this road was the eight-for-a-quarter ticket and 5-cent cash fare in use from 1910 to 1915, no change having been made in rates when the city took over the railway in 1914. In 1916 war increases made it necessary to sell the tickets at the rate of six for 25 cents, and in 1918 the cut-rate ticket was given up for a straightaway cash fare of 5 cents. As it happened, the years 1918 and 1919 were among the most active in the history of the community, with the result that 1918 at 5 cents showed more passengers and revenue than most of the corresponding months of 1917, while 1919 made a still better showing in comparison with 1918, the increase in passengers being from 299,516 to 364,839 and in revenue from $14,976 to $18,201.

However, there was then (1919) on the Board of Aldermen an enthusiastic believer in greater usefulness of the street railway in the person of Mrs. W. Garland Foster, chairman of the street railway committee. While acknowledging that the 5-cent fare had done well, she held the opinion that a twenty-five for $1 ticket would do still better if the right push were put behind the bargain rate. One member of the committee was with Mrs. Foster, another was opposed and a third was a benevolent neutral. When the matter was brought before the municipal council there was strong opposition, headed by the Mayor and by an Alderman who has since succeeded him in that position. However, the plan went through in April, 1920, and was continued to the end of December, 1920. At that time a combination of circumstances, especially the large cost of securing a supply of new tickets, the coming in of a new council and the hope that still larger revenues were possible, led to the return of the 5-cent fare. Mrs. Foster did not object to this decision, believing that time would tell whether the psychological appeal of the reduced rate was or was not as good as she believed. As a matter of fact, January, 1921, shows a drop to $1,512.35 at 5 cents compared with $1,643.95 at 4.66 cents fare in December, 1920. But it

TABLE I—COMPARISON OF LIKE MONTHS OF 1920 AND 1919

Month	Increase in Passengers
January	10,604*
February	6,774*
March	3,275†
April	6,338
May	5,590
June	3,067¶
July	7,738
August	7,633
September	5,880
October	5,482
November	3,930
December	2,043

* Exceptionally good weather; 5-cent fare.
† Last month of straight 5-cent fare.
¶ One car out for repairs three weeks.

may be that the storms of January, 1921, had as much to do with this as favorable weather did with the January, 1920, returns, which were $1,674.50 at a 5-cent rate of fare. In any event, this has been the course of affairs.

COMPARISON OF FINAL QUARTERS

If the first quarters of the years 1918, 1919 and 1920 are ignored because of the unusual January, 1920, noted, it will be of interest to compare the last nine months of the same years. It will then be found that the 1919 period showed a gain over 1918 of 28 per cent in traffic (293,302, against 228,986) and of 10.6 per cent in revenue ($14,668.16, against $11,449.31). Also a comparison of the last nine months of 1920 with the same period of 1919 shows that the traffic continued to rise, namely, from 293,302 to 341,003, or 16 per cent, and that revenue also continued to rise, namely, from $14,668.16 to $15,616.85, despite the fact that 50 per cent of the passengers were paying 4 cents.

TABLE II—PASSENGERS CARRIED, NELSON (B. C.) MUNICIPAL RAILWAY

	1914	1915	1916	1917	1918	1919	1920
January......	.....	16,285	18,409	23,872	24,096	23,130	33,734
February.....	20,932	14,964	18,114	21,312	21,649	22,778	29,552
March.......	24,827	15,892	19,817	23,524	24,785	25,629	28,904
April........	25,552	17,605	19,523	21,581	22,650	25,347	31,685
May.........	26,333	16,809	19,271	23,207	23,553	25,485	31,075
June.........	24,958	18,873	22,839	14,687	25,369	32,022	35,089
July.........	34,634	22,207	26,334	30,368	36,589	43,358	51,096
August.......	31,933	12,945	30,125	30,541	28,690	41,969	49,602
September....	23,087	20,721	24,877	25,452	27,669	33,662	39,542
October......	*	*	*	*	22,728	26,907	32,389
November....	*	*	*	*	17,673	29,021	32,951
December....	*	*	*	*	24,065	35,531	37,574
Total.....	.....	....	...	.....	299,516	364,839	433,193

* Information not available.

RATES OF FARE

Eight tickets for 25 cents and 5 cents cash, 1910–15.
Six tickets for 25 cents and 5 cents cash, 1916–17.
Five cents cash, 1918 to April, 1920.
Twenty-five tickets for $1, and 5 cents cash from April, 1920.
Five cents cash January, 1921.

Obviously, nothing is harder than to draw hard and fast conclusions in a period of changing business conditions. Nevertheless, it does seem from the following Table III that the change to a 4-cent ticket rate resulted in a stimulation of traffic:

TABLE III—RAILWAY EARNINGS, NELSON (B. C.) MUNICIPAL RAILWAY

	1916	1917	1918	1919	1920	1921
January......	$920.45	$1,193.60	$1,204.80	$1,105.45	$1,674.50	$1,512.35
February.....	905.70	1,065.60	1,082.45	1,169.15	1,464.45	......
March.......	990.85	1,176.20	1,239.25	1,268.00	1,429.90	....
April........	976.15	1,079.05	1,132.50	1,260.40	1,676.50	....
May.........	963.55	1,160.35	1,177.65	1,274.25	1,377.40	....
June.........	1,141.95	734.35	1,268.45	1,601.10	1,618.40	....
July.........	1,316.70	1,518.40	1,829.45	2,167.91	2,371.00	....
August.......	1,506.25	1,627.05	1,434.51	2,098.45	2,248.95	....
September....	1,243.85	1,272.60	1,383.45	1,683.10	1,786.40	....
October......	*	*	1,136.40	1,345.35	1,430.75	....
November....	*	*	883.65	1,451.05	1,463.50	....
December....	*	*	1,203.25	1,776.55	1,643.95	....
Total........................			$14,975.81	$18,200.76	$20,185.70	....

* Information not available.

In connection with the decline in rate of increase, it is worth noting that January, 1921, at the full 5-cent rate shows an absolute loss of approximately 3,487 passengers (33,734 passengers in January, 1920, against 30,247 in January, 1921), although it would not be fair to ascribe all the loss to the change in rate of fare.

AN EFFICIENT TOWN MOTHER IS MRS. FOSTER

During the period that reduced fares were in vogue Alderman Foster was also responsible for an up-to-the minute improvement in the pavilion at Lakeside Park, namely, the provision of electric plates, kettles and hot water for picnic parties. An old-fashioned flower garden was also added to help riding, but riding continued to increase even after the close of the park season.

In conclusion, it may be mentioned that Mrs. Foster's interest in street railways was not confined to the traffic or sales department. As a delegate of an organization convening at Ottawa she visited the Ottawa Car Company's plant to get the latest facts concerning one-man car operation, and one of her committee recommendations was "that a weed killer be used on the street railway, and, as the weed killer is poisonous, that the owners of animals in the city be warned not to pasture their animals on the streets." The reference to the use of highways for a grazing common indicates that Nelson is not exactly a crowded community!

Fares and Short-Haul Traffic

Graphical Study of Short-Haul Traffic Under Varied Combinations of Headways and Rates of Fare, Which Have Marked Effect on Gross Revenue of Railway Companies

BY EDWARD A. ROBERTS
Engineer with John A. Beeler, New York, N. Y.

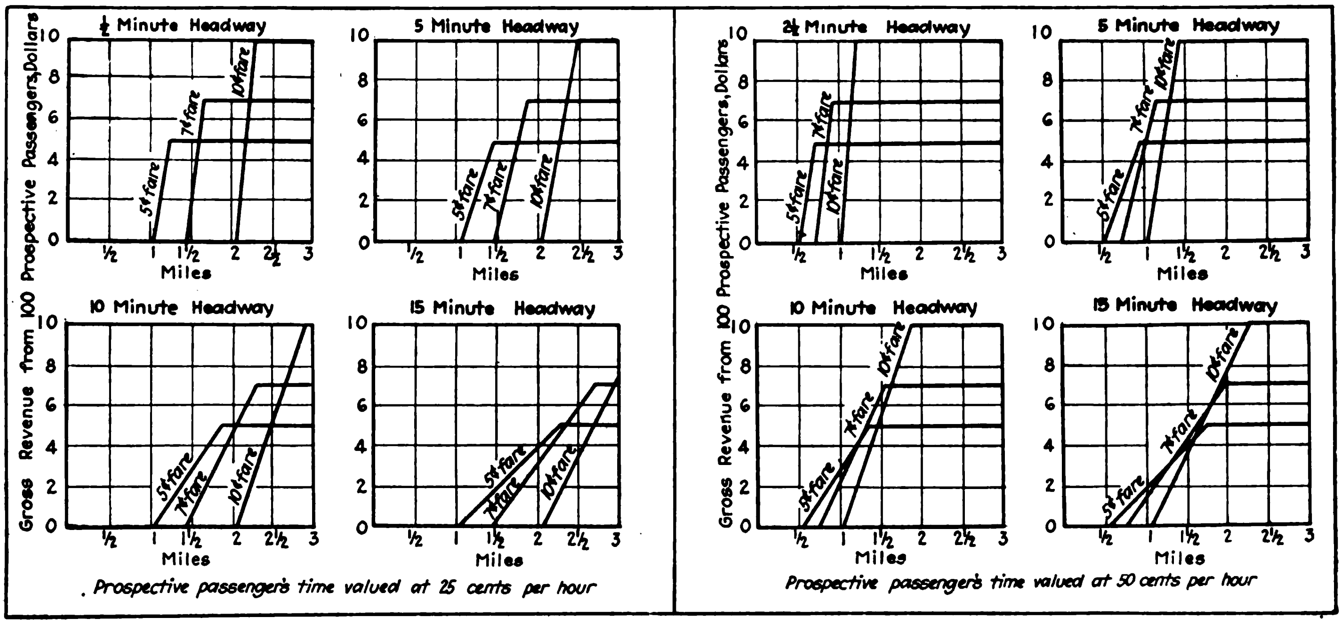
IT IS generally recognized that the rate of fare charged by a city street railway and the headway of service have a marked effect on that part of the company's gross revenue that is received from short-haul riders. The experience of virtually all companies which have raised their fares is that some of the short-haul passengers become pedestrians with each increment of fare, for which an allowance must be made in predicting the revenue that will be received from higher rates of fare. It is the purpose of this article to outline a simple process for indicating the effect of increases in fare on the gross revenue received from short-haul riders under varying conditions.

The first principle to take into account is the value of the short-haul rider's time. He will make a trip on a conveyance only when by so doing he saves enough time to compensate for the fare paid. If he cannot do this, he will walk or at least fail to patronize the street cars. To illustrate, if a man's time is considered as being worth 50 cents an hour, and the street car fare is 7 cents, this man in using the cars must save 7 cents' worth of time, which would be 8.4 minutes over the time required for walking.

The accompanying charts have been prepared to show the gross revenue receivable from each 100 persons who would use the street cars for rides up to 3 miles in length if it resulted in a saving of time sufficient to compensate for the fare charged. Three rates of fare, 5, 7 and 10 cents, four different car headways, two and one-half, five, ten and fifteen minutes, and two values of the car rider's time, 25 and 50 cents per hour are assumed.

The case of 100 persons desiring to take a street car ride of 2¼ miles on a line with a ten-minute headway will first be taken and the value of these people's time will be assumed at 25 cents per hour, and that they are capable of walking at the army rate of speed, 5 ft. per second. The average speed of the street cars will be considered as 10 m.p.h. To walk the 2¼ miles will take 39.6 minutes, while to ride will require 13½ minutes, so that the person who can board a car without waiting will save 26.1 minutes, while the person who has to wait the whole headway, ten minutes, will save 16.1 minutes.

On a 5-cent fare basis the price paid for the ride is equivalent in value to twelve minutes of the passenger's time. In this case the entire 100 people should be attracted to the street car service because of the time saving. With a 7-cent fare and a ten-minute headway, 16.8 minutes must be saved to compensate for the price of a ride. The man who can board a car immediately can afford to ride, but he who just misses one will be 0.7 minute or forty-two seconds better off by walking. If the 100 people are assumed as arriving at the stopping place at regular intervals, say six seconds apart, just seven of them will arrive during the forty-two seconds following the departure of a car, and consequently will fail to save time by riding on the street car. The remaining ninety-three will profit so far as time is concerned by riding, and at 7 cents each will yield $6.51. With a 10-cent fare, twenty-four minutes is required to offset the expense of riding. Direct connection will save 2.1 minutes over the walking time, but the man who has to wait ten minutes for a car would be much better off by walking. Only 21 per cent of the people will in this case find it a satisfactory financial transaction to pay the 10-cent fare.



Prospective passenger's time valued at 25 cents per hour

Prospective passenger's time valued at 50 cents per hour

DIAGRAMS SHOWING COMPETITIVE WALKING DISTANCES FOR VARIOUS HEADWAYS WHEN BASE FARES ARE FIXED AT 5, 7 OR 10 CENTS AND TIME IS VALUED AT 25 OR 50 CENTS PER HOUR

The point at which a sloping line in the charts starts upward indicates the minimum ride which a person is justified in taking provided he just connects with a car, which would be of course regardless of the frequency of service. The top point of the sloping line shows the minimum ride the person who waits the full interval between cars is warranted in taking. Stated in other words, the top point indicates the maximum distance a person who just misses a car would be justified in walking. The slope of the line bears a direct relation to the headway and is a measure of the doubtful zone in which a person might either walk or ride. The more frequent the service, the shorter should be the walking radius of possible riders.

The accompanying charts have been obtained by following out this process in detail for a number of different cases. The charts show that on the shorter trips the lowest fare yields the most revenue and they illustrate the bad effect of higher fares on short-haul traffic. They further give a definite indication of the relative values of increased rates and show that the total revenue resulting from increased fares is in many cases less than that received with a lower fare.

WHAT IS VALUE OF PERSONAL DEAD TIME

It should be noted that the minimum length of trip which a person is justified in taking on a street car does not vary with changes in headway, but depends only upon the rate of fare and the value of the person's time. The data indicated by the charts on this feature are as follows:

	Minimum Justifiable Ride-Miles		
	5-Cent Fare	7-Cent Fare	10-Cent Fare
Prospect's time at 25 cents per hour..	1.03	1.45	2.07
Prospect's time at 50 cents per hour..	.52	.72	1.03

Objection to the method used might be based on the rather far-fetched assumption that each probable rider arriving at a street car stopping place has to know exactly when the next car is due and that he has to go through some sort of a calculation to determine whether he will walk or will wait for a car. This, of course, is not done in detail under actual conditions, but it is a fact that the average person going but a short distance does often make a hasty survey, by looking up and down the street, to determine whether a car is approaching or has just left. This survey causes him either to walk or to ride. Most persons also either consciously or unconsciously put a fairly definite value on their time, and in deciding whether to spend money to save time they are swayed by the personal monetary value of time saved. Furthermore, the person who habitually makes the same short trip realizes very quickly whether the street cars always save him enough time to warrant their continued use. It is believed therefore that the method used for determining the proportion of possible riders that will be customers approximates fairly closely the actual conditions. This method of comparing results to be expected under different rates of fare also provides a good forecast.

The placing of a definite value on the average car rider's time is not at all a simple task, and one person's estimate is about as good as another's. A person's earning ability should, however, not be confused with

Steel Rails*

Expert Outlines Present Status of Rail Making and Raises Questions as to the Problems Which Have Been Suggested by Extensive Experience in Conducting Special Inspections

By C. W. Gennet, Jr.
Of Robert W. Hunt & Company, Engineers, Chicago, Ill.

THE first T-rail ever made in America was rolled at Danville, Pa., in 1845. Twenty years later the first bessemer steel rails were rolled at the North Chicago mill. It was just as difficult in the early days to obtain satisfactory rails as it is today.

It is estimated that a production of 4,500,000 tons of rail per year for the next five years is necessary in order to put the railroads in proper physical condition and to overcome deferred maintenance caused by the war. There will be difficulty in obtaining any such quantities, owing to the fact that many rail mills have been turned over to the production of other forms of steel.

No doubt rails wear rapidly in various places of heavy traffic and have to be quickly replaced, but, on the whole, there is little question that the general adoption of open-hearth steel has gone a long way toward satisfactorily solving problems of wear that were so frequently raised with bessemer rails. The question of safe rails is now much more important than whether rails will give a year or two more service.

Ordinary figures for failures are not particularly impressive except to the technician. But interpreting published records in a certain way indicates that for open-hearth steel one rail out of every eight hundred laid may be expected to fail and has to be replaced in the first five years of service. Only about half of the total failures are what may be termed of a dangerous type. The others mostly consist of defects occurring in the head of rails, which as a rule can be easily detected by careful surveillance and removed prior to the development of further trouble. Notwithstanding what the types of failures may be, or how prolific they may be, questions of specifications and manufacture are important and deserving of the fullest thought.

Unification of Rail Specifications Is Desirable

There is little use in threshing over the subject of specifications, except in a very general way. The matter is in the competent hands on the one side of the American Railway Engineering Association's rail committee, while on the other side are the manufacturers. The regrettable fact seems to be that the two sides cannot compose their differences, as by arbitration for example, and enable a single specification to be promulgated for general use by all the roads. My criticism of most rail specifications is that they are too broad in certain features and too narrow in certain others, with the result that both manufacturers and consumers suffer aggravating incidents that could easily be prevented. Manufacturers frequently find it difficult to get good steel quickly accepted, and on the contrary railroads are frequently bound to accept what unquestionably ought to be rejected outright.

To illustrate the point, consider for a moment 99-lb. rails for which there are at least four specifications in common use having their low limits of carbon varying by the small difference of four points. If a mill rolling for one customer whose low limit of carbon is 0.63 per cent happens to get a heat showing 0.62 per cent carbon but satisfactory in all other respects, the slight difference of one point of carbon in the specification makes it necessary for the rails, or perhaps the ingots, to be diverted from the original to some other customer. That possibly means allowing the ingots to get cold, later to be reheated and rolled—a performance almost bound to result in inferior practice both in the mill and later on the track. The matter of a few points of carbon, and possibly some other elements, has repeatedly been proved to be quite insignificant in the long run and easily overshadowed by the kind of treatment accorded the steel in the mill. Determination of what constitutes a reasonable minimum limit for carbon, and insistence on such as a standard, the same as 0.04 per cent has been fixed for years as a maximum for phosphorus, would be a great step forward in harmonizing specifications without serious detriment to the users.

Again, specifications lack breadth in the customary clause governing straightening. No doubt the specifications used in 1844 read the same as they do now, namely, that "rails must be straight in line and surface." The result of this requirement is that rails may be strained beyond their elastic limit in twenty or more places by repeated blows in the cold-straightening press, only then to be shipped to a 5- or 6-deg. curve and readily spiked into place. Modern section rails are exceedingly flexible and, providing they contain no short bends or sharp kinks, it would seem practicable to accept them within certain limits perhaps, without the damaging cold straightening now given to each and every rail. Experimental lots of such rails have given fair service and the subject deserves more attention.

The Item of Testing in Rail Specifications

Most rail specifications are too broad with respect to the testing, both chemically and physically. The chemical composition is invariably obtained by analyzing drillings taken from a small test ingot weighing a couple of pounds and cast while the regular ingots are being poured. There is no prescribed size or shape for the test ingots used by the different mills, nor restriction on whether they shall be cast from the first, middle or last part of a heat. In fact, no restrictions prevail of any moment whatsoever, pertaining either to the test ingots, *per se*, or to the chemical practice that may be later followed in doing the analytical work. The result is that the actual chemical composition reported by the mills for their steel may vary decidedly as between different mills, so that a 65 carbon heat in Colorado may be quite different from a 65 carbon heat in Alabama or Pennsylvania. It should be said in justice that this subject is being investigated and early action is hoped for.

The physical tests do not, as a rule, go far enough to protect against bad or unsound rails being accepted and laid in the tracks, only to be replaced perhaps after a short service. Testing two or three pieces of rails to represent as many as two hundred made from perhaps fifty ingots, each possessing marked individuality, even though from the same heat, is incompatible with the tests prescribed for many other products on whose use hinges no important question of life. A requirement for oil line pipe is that each and every length, in addition to passing a careful surface inspection on both the inside and the outside, shall withstand a prescribed pressure test. Each piece of cast-iron water pipe, whose walls may be an inch thick, must likewise be tested and inspected. And a most odious comparison with the tests on rails is afforded by a recently adopted specification for wrought-iron tie plates, which requires a complete tensile test to be made on one out of every thousand plates, a proportion by weight which if applied to rails would mean something like sixteen tensile tests per heat. The proposed abandonment of the drop test, for years recognized as a standard test for brittleness, and the plan of covering this feature by resort to a measurement for ductility obtained under difficult and uncertain conditions, is regrettable. Granting the importance of ductility for rail steel, the imposition of arbitrarily determined limits for it, the matter of measuring it satisfactorily except in the laboratory, and finally the question of accepting or rejecting rails whose ductility varies by a hundredth part of an inch, is, to my way of thinking, positively dangerous. Would it not be better to waive the question of the ductility of rails entirely, as it was so long an unknown thing, and to devote more study to the definition of "interior defects" and such positive methods for detecting them as would permit of rejecting those rails whose test piece fractures show unmistakable signs of segregation?

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*Abstract of paper read before the Western Society of Engineers, Chicago, Ill.

The manufacture of basic open-hearth steel rails of modern sections is a process fraught with many questions of practice very different from that followed in the bessemer methods of a few years back. The introduction of large furnaces from which a hundred tons of steel is tapped for a single heat, the casting of as many as fifty ingots on a heat, the use of large heavy ingots, and last, but not least, the fact that modern rail steel is sufficiently high in carbon to be easily susceptible to heat treatment, are features so influencing the general process as to make constant attention necessary to matters that in the old days were scarcely present at all. My observations of manufacturing conditions, resulting from the closest of contact with the special inspection of rails at all of the different mills, convince me that many of these often neglected matters are paramount to other details so frequently brought to the front, as, for instance, a few points of carbon. And in this connection permit me to say that special inspection has not only revealed many important incidents that no mill superintendent will condone when his attention is called to them, but it has also afforded opportunity for tracing the history of bad rails in service back to some slighted detail of manufacture no doubt responsible for the failures.

SOME PERTINENT QUESTIONS ON STEEL MANUFACTURE

I regard the manufacture and rolling of rail steel as of more importance than that of any other steel product, and conditions emphasize the necessity of making thorough studies of the various features of present-day methods. Such studies must frequently be based not only on the manufacture itself but on the story that the rails in service may later tell. Records for many subjects are already in hand and time and work are merely required to afford definite information on questions of great value to both railroads and manufacturers. Literature is very weak on many of the subjects that ought to be investigated and discussed. And among the many questions that can be raised I suggest some of the following, pertinent of modern practice and especially appropriate, therefore, for original research and study:

1. Are rails made of steel by the continuous Talbot furnace process comparable with those made by the straight open-hearth method? In the continuous process the furnace is seldom emptied, but a hundred tons or so of steel is tapped every two hours, as against the ten hours of time required to make an equivalent heat in a regular furnace. Is the steel from the rapid working Talbot furnace sufficiently free from oxides and other impurities to afford good, sound rails, and how can such a matter be quickly proved?

2. What effect, if any, on rails has steel made by the Duplex process, wherein highly oxidized metal is added to the open-hearth furnace, sometimes very soon before tapping? How can rails rolled from steel containing excessive amounts of impurities be detected?

3. What effect on rails is produced by recarbonizing the steel in the ladle with coal or coke and then adding cold deoxidizers to the ladle? What is the real effect produced by holding a ladle of steel prior to casting the ingots to permit of time for the chemical reactions to settle?

4. What is the effect on rails rolled from ingots cast with running stoppers and sometimes without any control by the ladle operator? How does the size of the nozzle, pouring temperatures and time required to cast the ingots of a heat influence rails?

5. How soon after casting ingots should they be charged into the soaking pits in order to assure a minimum of piping and segregation? What effects are produced by delays in promptly charging the ingots to the pits, and what is the effect of unduly and rapidly chilling the outside or skin of the ingots?

6. How long a time and under what conditions of gas and air regulation should ingots remain in the soaking pits? What kind of control of the pits is best to insure against overheating or burning the ingots? What is the effect of rolling rails from ingots one side of which has been heated so hot as to show a bright white spot significant of overheating?

7. What effect on rails have different rates of blooming the ingots? In some cases 8-in. x 8-in. blooms are made from ingots in nine passes and in other cases in twenty passes. Some mills work rapidly and others slowly; does this produce any difference?

8. What effect on the grain structure or the life of rails is produced by increasing the number of passes, or work given to the steel, when the ingots are rolled into rail? One mill makes a rail from an ingot 19 in. square in fifteen passes, while another mill makes the same rail from an ingot 24 in. square in twenty-nine passes. Has the average rate of reduction per pass any effect on the life of rails?

9. What matters mostly influence the production of rails showing seams on the surface? Some heats are practically free from indications of seams, while on other heats rolled at the same time seams are abundant.

Signal Tail-Lights for Safety Cars

SAFETY CAR EQUIPPED WITH INDICATING SIGNALS

RED and green tail lights which are alternately automatically cut in, red to indicate power off and green to show power on to the following car, truck or automobile, are being installed on all of the safety cars in Terre Haute, Ind. Seventeen cars have been equipped at the time of this writing and the remaining forty-three cars are being equipped at the rate of four or five a month as they come into the shop for regular overhauling. This signal arrangement was described in the ELECTRIC RAILWAY JOURNAL for Aug. 3, 1918, in connection with its use on cars of the Philadelphia Rapid Transit Company for service to the Hog Island shipyard and on cars of the Cleveland (Ohio) Railway. As the Cleveland cars are single-ended the signal lights are carried at the center of the dash.

Stirling Boiler Improved

Recent Modifications Which Have Been Made in the Design Make for Standardization, Greater Accessibility and More Convenient Setting

SEVERAL changes have been made during the last few years in the design of the Stirling boiler by the manufacturers, the Babcock & Wilcox Company. A side view of the latest type, equipped with a superheater and a chain grate stoker, is shown in the accompanying engraving. Briefly, the changes from the original type can be grouped under seven heads:

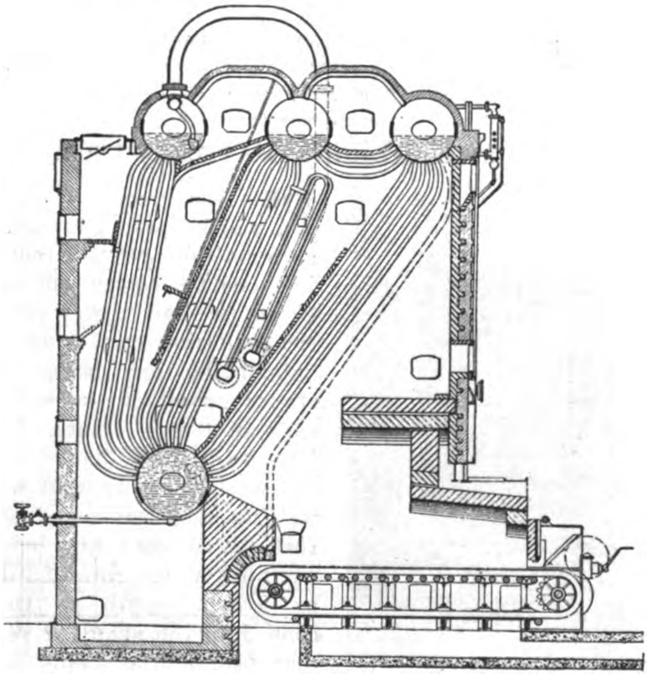
1. All steam drums are now placed on the same level, the steam being taken from the rear steam drum. The primary purpose of this is to reduce priming with concentrated water.

2. Protection of the rear steam drum is given by a baffle carried on the front tube of the rear bank, this tube being expanded into the center drum.

3. The arrangement of the tubes circumferentially on the mud drum is such as to give a larger superheater chamber than before. This permits a greater amount of superheating surface for higher superheat than hitherto has been obtainable and also greater ease of access to the superheater headers and handhole caps.

4. In stoker-fired work, except in the case of stokers of a design that permits of carrying the front boiler wall, this wall is carried on supporting members furnished as part of the standard boiler equipment. Where this front wall is so carried a slip joint between the front boiler wall and that portion of the wall carried on the stoker is used. These features not only definitely fix the responsibility of carrying the front boiler wall but give a front wall construction that may be repaired without taking down the entire wall.

5. Where the size of the boiler wall is such as to make it advisable the use of bonding tile with properly designed supporting members is standard construction in the front wall. This construction, as proved in operation, is successful in overcoming the tendency of the front wall to spring inward.



SECTION THROUGH ONE OF THE NEW CLASSES OF STIRLING BOILERS

6. In the earlier designs, where battery settings were installed, a three-legged center support was standard in the battery wall. In the redesigned boiler the center support has but two vertical members, doing away with this objection.

7. In battery settings special means of access for inspection of the inside mud drum heads is standard in the redesigned boiler.

The studies that have led to the redesigning of the Stirling boiler naturally led to a consideration of the variation between classes and sizes of boilers. This has resulted in an entirely new classification in which the variation between the classes and sizes is simple, logical and progressive. While the purchaser of steam boilers is not primarily interested in methods of manufacture provided proper construction methods are followed, it is, however, the purchaser who ultimately receives the benefit of any improvements in manufacturing methods.

This reclassification will undoubtedly lead to a reduction in manufacturing cost through a reduction in inventory of material that must be carried in the number of standards in use, etc. While the manufacturer of this boiler will offer previous standards to complete plants in which such standards were installed, it is the intention to offer the redesigned and reclassified boilers for all new work.

A. S. M. E. Papers on Boiler Operation and Boiler-Water Analyses

THE results of a series of eleven tests made on a 468-hp. Edgemoor boiler fired with pulverized coal, at the Oneida Street Station of the Milwaukee Electric Railway & Light Company, reveal that the customary specification of pulverizing coal to the extreme fineness of 85 per cent through a 200-mesh screen is an unnecessary precaution. These tests, conducted by Henry Kreisinger, research engineer Combustion Engineering Corporation, and John Blizard, fuel engineer United States Bureau of Mines, and the results of which are printed in the May issue of *Mechanical Engineering*, published by the American Society of Mechanical Engineers, indicate also that completeness of combustion is more a matter of a proper furnace and burner design and of the right way of supplying air rather than of the fineness of the coal. It was also found that undried coal could be burned as successfully as fuel dried to 1 per cent moisture, the only difference being a slight decrease in efficiency which checked closely with the increase in losses due to evaporating the increased moisture in the coal. The best results were obtained when the coal was burned at a rate of 1 to 1.5 lb. per cu.ft. of combustion space per hour.

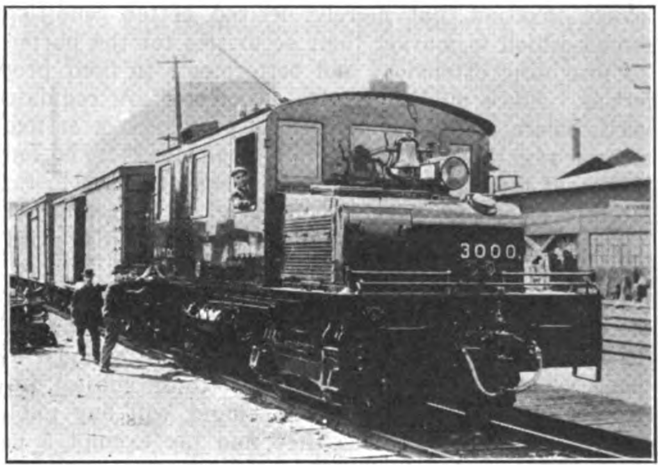
In considering the corrosive effects of boiler feed water, J. R. McDermet, research engineer the Elliott Company, in an article in the same publication states that boilers operating below rating rarely suffer any damage from corrosion from oxygen whatever its content in the feed water. Regardless of the forcing, however, if the concentration of oxygen be kept below one part per thousand by volume pitting action is seldom experienced.

The corrosion of cast iron, in its initial stages, is more rapid than that of steel, but the adhering residue immediately forms a protective coating which arrests further action. Cast-iron economizer corrosion is due to the continuous removal of this protective coating.

New Locomotive for Monongahela Valley Traction Company

THE Monongahela Valley Traction Company has recently purchased a new 50-ton class B Baldwin-Westinghouse locomotive, which is a duplicate of locomotive No. 2,000, installed about two years ago. The new locomotive has just been placed in service.

The locomotive is equipped with four type 562-D-5, 100-hp., 600-volt, field-control motors and double-end HL control. It will be used for general utility haulage, as this company does extensive business on a steam-railroad basis of operation. An important part of the business is the movement of gasoline tank cars from Jackson's mill on the Clarksburg Weston lines to the freight interchange of the Baltimore & Ohio Railroad near Clarksburg.



MONONGAHELA VALLEY 50-TON LOCOMOTIVE JUST PLACED IN SERVICE

The general characteristics of this locomotive are as follows:

Weight	50 tons
Maximum tractive effort at 25 per cent adhesion..	25,000 lb.
Normal tractive effort at 9.7 m.p.h., full field, one hour	15,200 lb.
Continuous tractive effort with forced ventilation, short field	9,000 lb.
Maximum trailing load starting on ½ per cent grade.	860 tons
Balancing speed, short field, at 600 volts on level with 500-ton trailing load..................	17.5 m.p.h.
Balancing speed, short field, at 600 volts on 3.0 per cent grade with 200-ton trailing load.........	10.5 m.p.h.

The locomotive will also be used in conjunction with locomotive No. 2,000 in hauling coal to the Domestic Coke Company plant at South Fairmont, as well as for hauling carloads of slag for ballast work along the railway company's tracks. Freight business on this property has increased considerably, both in carload and less-than-carload movement, the latter being handled on a package-freight basis.

The Spray Gun for Painting

THE firm of W. N. Matthews & Brothers, St. Louis, Mo., is now marketing the Matthews automatic spray gun for painting. This spray gun is furnished in two types, one designed for general painting purposes in industrial and manufacturing plants when quantity production is essential, and for painting large areas, general house painting, etc. With this type of gun the container holding the paint is suspended above the surface being painted and the paint flows to the gun through a hose. The feature of this spray gun is that the air and paint are mixed at the point of the nozzle and not inside the gun. The other type is the jar type, which is especially adapted for use in plants where frequent changes in paint are required. This gun is designed so that the paint is held in a small container which is screwed to the under side of the valve.

Either of these models can be adjusted to produce either a narrow line or to throw a spray of sufficient volume to cover 80 sq.ft. per minute. The air pressure necessary varies from 10 to 80 lb. per square inch, depending upon the character of the paint being used.

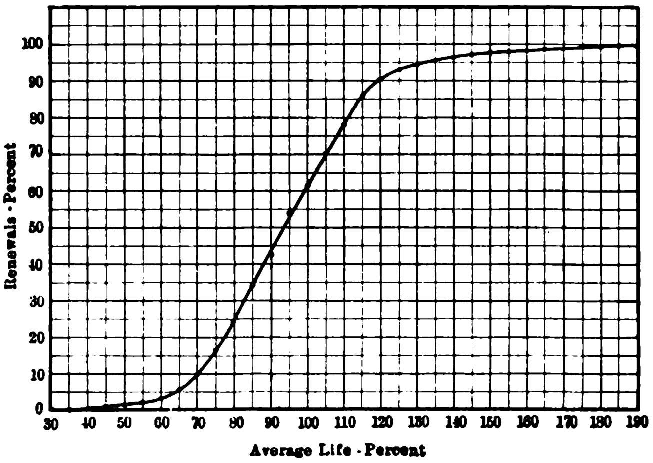
Tie Renewals in Relation to Average Life

RECORDS kept by the Forrest Products Laboratory, Madison, Wis., have shown that there is a general law governing the rate of renewals in all groups of railroad ties, no matter what kind of wood is used in the ties, where they are placed or whether they are untreated or treated with preservatives. These records show a wide variation in the lives of various groups of ties, but a remarkable similarity between the percentages of ties that need replacement at proportionate intervals in the lives of any two groups.

The comparisons are based on forty-three groups, including 42,000 ties of many species, some untreated and some treated. For any of these groups, the percentage of renewals in relation to the percentage of average life is fairly represented by the curve shown.

This curve answers several valuable purposes. It can be used in estimating the average life of a group of ties long before all the ties in the group have been removed, also to show the number of replacements that will be necessary during a given year.

As an example, assume that out of a group of 1,000 ties, 200, or 20 per cent, have been removed at the end of four years. From the curve it will be seen that 20 per cent of a group is usually removed at about 77 per cent of the average life. The average life of this group, then, will be 5.2 years. Further computation shows that the number of replacements to be expected during the fifth year is about 350, the sixth year 300, the seventh 100, and that at the end of nine years practically all the ties in the group will have been removed.



TIE RENEWALS IN RELATION TO AVERAGE LIFE

Thus, with the aid of the curve, it is possible to predict the average life of any group of ties even while most of them are still in service.

American Association News

ASSOCIATION'S PUBLICITY PLAN AS OUTLINED—ENGINEERING AND OTHER ASSOCIATION REPORTS ARE BEING WHIPPED INTO FORM—EXECUTIVE COMMITTEE SELECTS ATLANTIC CITY FOR CONVENTION, WHICH WILL BE HELD IN NEW HALL ADJOINING BOARDWALK

Atlantic City Gets 1921 Convention

ONCE more Atlantic City has been chosen as the location of the annual convention of the association. The 1921 convention will be held during the week beginning Oct. 3. In view of the fact that there are to be no exhibits in connection with this year's convention arrangements have been made to hold the meetings in a new building that has only recently been completed on the Boardwalk at North Carolina Avenue immediately in front of Haddon Hall.

This building has a large convention hall, where the principal meetings will convene, and immediately adjacent thereto are smaller rooms that are to be used for the meetings of the affiliated associations.

The subjects committee has already mapped out a program for the American meetings of extraordinary interest. This will be announced at an early date. The program for the affiliated associations will consist mainly of committee reports and addresses, dealing as usual largely with railway operation. Delegates who attend the convention are urged to come prepared to avail themselves of the especial opportunity that is to be given to enter into a full discussion of the reports and papers on the floor of the meeting.

The usual arrangements have been made with the Hotel Men's Association for accommodations and those who are planning to attend should make their reservations at an early date.

Full details as to the program and other matters of interest pertaining to the convention will be published from time to time as they are completed.

Sales Taxes Uncollectible on Urban Car Fares

PHILLIP H. GADSDEN, chairman of the joint tax committee representing the American Electric Railway Association, the American Gas Association and the National Electric Light Association, in a statement before the Senate finance committee on May 10, said it would be very difficult, and almost an impossibility, to apply a sales tax on street car fares. So far as the electric and gas utilities are concerned, the same would apply where the prepay quarter meters are used. The cost of changing the 1,250,000 prepay meters in the country so as to collect a 2 per cent tax from the consumer would be $2.50 per meter. The tax that would accrue on the basis of the average consumption of gas at $1.50 per thousand feet would yield only 37½ cents to the government per annum. In other words, to collect the tax these utilities would have to make an investment of about as much as the government could collect in taxes in seven years.

A revision of the federal tax laws to preclude the issuance of tax exempt government securities so as to enable regulated industries to dispose of their securities was also declared vital to the utilities.

Mr. Gadsden said that public utilties did not seek to evade taxation, but merely desired better conditions under which to market their securities for the purpose of providing extensions and betterments to their properties. Since public utilities as a class are regulated as to operation and compelled to give service at fixed prices regardless of economic conditions it is only fair that they be considered as a separate class in taxation legislation. The appointment of a special subcommittee to make a thorough study of the public utility tax situation was urged.

Two features of the securities situation which were declared vital to the continued operation of public utilities are: Persons upon whom public utilities must depend very largely for new money—those subject to a surtax of over 3 per cent—no longer will buy public utility securities, because they find tax exempt 5 per cent government securities better investments.

The only persons who, under the present tax laws, find it profitable to buy public utility securities are those whose incomes are less than $10,000 a year. Their combined savings are only $116,000,000, or about $1,884,000,000 less than is required by the public utilities, including steam railroads, electric railways, gas, electric light and power plants, annually to make their betterments and extensions.

The most serious question which confronts public utilities is their inability to secure the new capital required annually in competition with tax exempt municipal securities.

Under the law public utilities are limited to a return on their investment of not over 8 per cent. Unless they can pay over 8 per cent they cannot compete with exempt municipal and state securities.[*] The result of this situation is that inevitably these extensions and betterments cannot be made. Service will slow down and become unsatisfactory and there becomes a growing demand on the part of the public for the acquisition of these utilities by municipalities on the ground that they could borrow money at not over 5 per cent. In other words, while the political policy of this country is firmly and definitely opposed to municipal and government ownership of utilities the taxation policies of our government are forcing it whether it is wanted or not.

Unless the policy of exempting municipal securities is discontinued we are rapidly drifting into practical socialism, which in its essence means ownership of everything by the public.

What is the answer? First, follow the advice of Secretary Mellon in his recent letter to the chairman of the ways and means committee and forbid further issuance of tax exempt securities. This, however, will fail to relieve the present public utility situation. It is estimated that there are $14,000,000 of tax exempt securities now outstanding. If the public utilities are to develop as they should there must be some relief from discriminatory burdens of taxation as it affects the investor. This position must not be misunderstood. The public utility companies are not themselves asking for any relief in taxation, for they propose to pay their full measure of taxation, but they think some plan will have to be devised by which their securities can compete successfully with those already under tax exemption laws.

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[*] This estimate is based on a computation of interest rates, which included, among its factors, the risk involved and the effect of the Federal income taxes. Public utility capital was considered as having been raised on the usual ratio of bonds and stocks.—[EDS.]

What Is the Association's Publicity Plan?

UNDER date of May 5 President Gadsden addressed a letter to all member companies, asking for contributions to support the publicity work being carried on at the association's headquarters under the direction of the committee of publicity. In his letter he states that the audit of the books of the association has progressed far enough to make it clear that a special assessment will not be necessary, for the obligations of the association can be met out of current receipts without its work being curtailed. Since the defalcation was discovered publicity work has proceeded along the lines laid down by the Committee of One Hundred and the results to date more than justify the belief of the publicity committee that much good can be accomplished by its plan. Continuing, he said that at his request the publicity plan of the Committee of One Hundred for future work and any action looking toward financial contribution to carry on this publicity had been deferred until it was determined whether it would be necessary to call upon the membership to make up deficits accruing on account of the recent defalcation.

Now that such an assessment is not necessary, the committee proposes to carry out its original plan. President Gadsden believes that the great importance of carrying on the proper sort of publicity is realized and therefore urgently requests that all members give the program their closest attention and co-operation.

WHAT THE PLAN IS

With a view to obtaining a better public understanding of electric railway problems, the Committee of One Hundred, co-operating with the publicity committee of the American Electric Railway Association, opened on Jan. 1, 1921, an advertising section in the association offices, New York. .

The functions of the advertising section are: To offer free suggestion, advice and counsel to electric railway companies on their advertising and publicity problems; to prepare for local distribution, car cards, leaflets, booklets, newspaper advertisements and other advertising material; to prepare bulletins on the electric railway situation for the use of public speakers, for distribution by bond houses, investment bankers and other institutions engaged in the sale of electric railway securities, and for utility managers to use as good will promoters; to issue to the press statements, news stories, speeches and articles of interest regarding the industry; to co-operate with state and national public utility information committees; to act as a general clearing house between electric railway companies for the dissemination of advertising and publicity material; to make engagements for widely known speakers before national conventions and other large gatherings for the discussion of electric railway problems, and to co-operate with these speakers in seeing that they obtain correct facts upon which to base their addresses and that their remarks receive proper distribution; to study the motion picture field in an effort to adapt it to use as an electric railway advertising medium.

RESULTS TO DATE

Since the advertising section has been opened more than a million copies of leaflets containing constructive facts calculated to inspire fairer treatment of electric railways have been distributed through local companies.

Co-operation has also been manifest with newspapers, for hundreds of columns of news material have been printed. Among the items covered have been the condition of the electric railways nationally; the financial needs of public utilities; financing and refinancing of electric railways; wage reductions.

The section has also prepared and distributed to the member companies a summary of references to electric railway legislation suggested by the Governors in their annual legislative messages and car cards summarizing the findings and recommendations of the Federal Electric Railways Commission.

It planned and helped to carry out National Electric Railway Day, May 4, 1921, which resulted in driving home through parades, motion pictures, display advertising and newspaper stories, varying in length from 600 words to a column and a half, the lesson of increased efficiency of electric railways and low charges for service.

In addition the section has through its chief, Labert St. Clair, aided by advice and suggestion many local companies in making special campaigns.

MATERIAL NOW AVAILABLE

The section now has ready for distribution two leaflets, a booklet, wall cards, etc. A textbook on electric railway advertising is in preparation and will be sent out as soon as it is off the press. This book tells how to advertise electric railways through every known channel. It discusses in understandable language newspaper advertising and publicity, car cards, leaflets, letters, company sections, public meetings and the many other mediums through which electric railways can sell their service to the public.

Pending the financing of the activities of the advertising section there has been a nominal charge for certain of the leaflets enumerated above, but when the financing plan is completed all the literature as well as service will be supplied gratis.

Committee on Safety Holds Final Meeting

ON MAY 10 the Joint T. & T. and Claims Association Committee on Safety held its final meeting at association headquarters and approved a tentative draft of the report which is to be presented at the annual convention.

Those present were E. C. Spring, Lehigh Valley Transit Company, and R. E. McDougall, New York & Harlem Railroad, co-chairmen; H. O. Allison, Beaver Valley Traction Company, proxy for W. H. Boyce; A. J. Van Brunt, Public Service Railway, proxy for H. V. Drown; E. M. Walker, Terre Haute Traction & Light Company; W. F. Weh, Cleveland Railway, and L. H. Palmer, United Railways & Electric Company of Baltimore, sponsor for the committee.

The report speaks of the necessity of some concerted action in public safety work not alone by the street railways but in co-operation with other civic bodies and local industries affected by the dangers existing in the communities.

The committee has mapped out a plan of co-operation whereby it is hoped effective results can be obtained to decrease the volume of accidents. That there is need of such an effort is reflected in the analysis of the replies to the questionnaire sent out by the committee.

Large Attendance at Equipment Committee Meeting

THE equipment committee of the Engineering Association held a two-day meeting at association headquarters in New York City on May 4 and 5. The several sub-committees discussed their particular subjects on the first day and formulated recommendations which were made to the entire committee which assembled on the second day. Those present were Daniel Durie, West Penn Railways, chairman; W. S. Adams, the J. G. Brill Company; H. A. Benedict, Public Service Railway of New Jersey; R. H. Dalgleish, Capital Traction Company; James C. C. Holding, Midvale Steel & Ordnance Company; H. A. Johnson, Metropolitan West Side Elevated Railway; T. R. Langan, Westinghouse Electric & Manufacturing Company; F. H. Miller, Louisville Railway; E. D. Priest, General Electric Company; F. W. Sargent, American Brake Shoe & Foundry Company; C. F. Scott, General Electric Company; Karl A. Simmon, Westinghouse Electric & Manufacturing Company, and C. W. Squier, ELECTRIC RAILWAY JOURNAL. In addition to the regular members of the equipment committee, R. W. Steigerwalt represented C. F. W. Rys of the Carnegie Steel Company, and W. H. Phillips, R. D. Nuttall Company, and N. B. Trist, Carnegie Steel Company, were present at the invitation of the committee to assist in developing standards which the committee is considering.

Proposed additional standards for brake shoes, brake-shoe heads and brake-shoe keys were discussed at considerable length, and it was the general opinion that all dimensions except the radius for the face contour could be properly standardized at this time, this radius to be specified by the customers to suit the diameter of wheel used. The tread and flange contours as presented by last year's equipment committee appeared to be satisfactory, and this year's committee considers it inadvisable at this time to add to the list, as it thought the present number should take care of all requirements.

In regard to a standard wheel contour for cast-iron wheels, the committee felt that a progress report was all that could be presented this year as the thickness in flanges of cast-iron wheels differ to such an extent from steel wheels that it would necessitate changing other standards which had already been adopted. The proposed specification for carbon-steel wheels was discussed and changes were recommended which will bring this into agreement with that of the American Society for Testing Materials.

The sub-committee on car arrangement and design presented a very exhaustive written report for consideration. This is to be reviewed by various members before next meeting and reported on with any additional suggestions or comments.

The sub-committee on life of wearing parts has obtained satisfactory information from fourteen properties, and additional information is expected from six others. The equipment committee expects to include in its final report comments on shop practices and methods which would aid in increasing the life of wearing parts as it is felt that greater publicity in regard to this matter is desirable.

The sub-committee on direct-current lightning arresters reported that a questionnaire had been sent out to 225 properties and so far replies have been received from but thirty-five. From the replies received it develops that lightning conditions appear to be the most severe along the Ohio and Mississippi Valleys.

Specifications for gears and pinions were discussed and it appears that the present association specifications can be brought into agreement with that proposed by the American Gear Manufacturers' Association without much difficulty, and an effort will be made to accomplish this. A revision of the specification for heat-treated axles and similar forgings is not to be attempted this year.

A report was presented showing the results of a test on wheels in service with a curved contour, and it appeared from present results that this type of contour tends to produce excessive wear on the flanges and is not desirable. A general outline was given of the report which is to be presented on the design of a typical shop building. Various suggestions were made for additions, and it is evident that this report will be very complete.

Reports on Power Blocked Out

AT THE meeting of the Engineering Association committee on power generation, held in New York City on May 11, reports of sub-committees were discussed. Of the four topics assigned the following dispositions were made: A form of contract for purchase of power, progress report only; comparative costs of steam produced from different fuels, the preparation of a non-statistical summary of the factors involved was approved for inclusion in the report; progress on the super-power plan outlined by W. S. Murray at the 1920 convention, to be covered in a digest of the forthcoming government report, with suggestions regarding relation to electric railways; on multiple-unit automatic substation, a lengthy illustrated paper was tentatively approved for inclusion in the report.

The meeting was attended by A. B. Stitzer, New York City, chairman; L. D. Bale, Cleveland, Ohio; H. E. Davis, Utica, N. Y.; G. W. Saathoff, New York City; L. R. Shattuck, New York City, and H. B. Reynolds, New York City.

The container idea in transportation is making considerable headway in the steam railroad field. One of the latest developments is that which is taking place on the New York Central Railroad, which has experimented with the plan on a considerable scale and is now having manufactured a number of container equipments. The New York Central's "express" type of car for this service is 55 ft. long, so fitted that it can be incorporated in a standard passenger train. It carries nine steel containers, 9 ft. wide by 6 ft. long, with an inside clear height of 7 ft. 4 in., and a door 3 ft. x 6 ft. They are made as nearly burglar and fire proof as possible, are weather-tight and have a carrying capacity up to 3 tons each. They have wood floors and special attachments for convenient lifting and handling. The freight-train type is provided with containers of two sizes, 14 ft. and 7 ft. long, respectively, so that two large and two small of the removable sections fit on a 50-ft. freight car.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Detroit Strike Averted

Amalgamated Officials Place the Wage Issue Squarely Before Men in That City

After a period of bickering lasting since last December, platform employees of the Detroit (Mich.) United Railway in Detroit voted on May 6 to adopt the Cleveland plan of wages offered by the Detroit United Railway which was rejected almost unanimously a week previous when a strike was voted. A new agreement to be enforced for one year will be arranged for between representatives of the men and company officials.

Besides the reduction to the new scale of 55 cents, 58 cents and 60 cents for Detroit city employees and to a new scale of 53 cents, 56 cents and 58 cents for employees in other southern Michigan cities, the terms of the new agreement vary from the old one regarding overtime. Under the new agreement time and one-quarter will be allowed for time over eight hours with time and one-half for overtime on Sundays and holidays. Under the former agreement time and one-half was paid for all overtime.

FORMER DECISION REVERSED

The strike, which was first voted by the men to be effective on May 1, was postponed for one week when President Mahon made a seven-day agreement with the company with a view of again submitting the matter to the men. The president considered the proposed strike suicidal at the present time and a sacrifice of the union.

The vote followed a final mass meeting of the men employed on the Detroit city lines, held Wednesday evening, when the union leaders summed up the situation and without recommendations put the matter squarely up to the men to decide whether or not the proposed cut in pay would be accepted or a strike called. The further mass meetings had been called by representatives of the men because it was believed that the men had not clearly understood the situation when they voted to strike in case the company would not renew the existing agreement as in force for the last year.

The outlining of the industrial situation throughout the country by W. D. Mahon, president of the Amalgamated Association, and the presentation of facts concerning wage reductions in other cities, are reported to have had considerable influence with the men in bringing about the final result.

Many of the employees changed their attitude regarding the proposed wage reduction when it was announced by the municipal street railway commission that the same wage scale as proposed by the Detroit United Railway or 55 cents, 58 cents and 60 cents an hour was to be put into effect on the municipal lines on May 1. The Detroit United men had counted upon having the moral support of the wage scale of 70 cents, 73 cents and 75 cents being continued on the city lines, but the announced cut on these lines was believed by both officials of the company and of the union to have been influential in averting the threatened strike.

The city employees had voted to follow the example of the Detroit United Railway employees in the event of a strike, and thus the company and the city were in the same position in the effort to reduce wages. The men also believed that the company was more thoroughly prepared for a strike than on previous instances.

The referendum was taken Friday to decide whether the men would strike, accept the 55-cent, 58-cent and 60-cent wage scale offered them by the company, or accept the 50-cent, 55-cent and 60-cent wage with the privilege of arbitrating the whole matter later.

Small Town Folk Should Study the Case of Bowling Green

Folks in small towns where the existing electric railway is fighting for its life are admonished to beware by the Savannah (Ga.) *Press* lest they inherit a pile of junk. The lesson which this paper draws is taken from the experience of Bowling Green, Ky. The *Press* said recently:

> Bowling Green, Ky.! That's the place! It doesn't look big on the map. Even in the census reports, it is said to consist of only 15,000 people.
>
> But one in every three of those 15,000 owns an automobile. Nice little town. What?
>
> Every automobile has at least two seats. some have four or five. Some seven. At a fair guess there is more than one seat each for every inhabitant of Bowling Green. So the whole town could go riding at one time if a strenuous effort were made.
>
> Yet there are such things as pedestrians in Bowling Green. Even people that own cars walk sometimes. One of them recently walked into a street car. Possibly the motorman was dozing. In a town where every third man owns a car and the other two ride with him, there is not much left for a motorman to do. Anyway, the street car business was bad in Bowling Green and when the injured pedestrian sued the company and got a substantial verdict, the railroad magnates decided that the game was no longer worth the candle. So they threw up their hands and surrendered their cars, rails, crossties, franchises, etc., in satisfaction of judgment.
>
> Of course, they might have gone before the Railroad Commission and obtained leave to raise their fares so as to get the amount of judgment out of their few remaining passengers. But the harder they squeezed, the fewer would be their passengers.
>
> Whatever may have been the process of reasoning, the company quit. And the unfortunate plaintiff got, instead of a fat check, a pile of junk.

Blanket Franchise Discussed

Readjustment Essential to Preservation of Value of Railway to the Community

Preliminary discussion of the proposed blanket franchise submitted by the Virginia Railway & Power Company, Richmond, Va., was held recently by the committee on streets. Assistant City Attorney George Wayne Anderson and Directors Sayville and Trafford pointed to safeguards that must be thrown around the city's interests before such a franchise can be granted.

Chairman Puller advised the employment by the city of expert advisers in connection with the franchise discussion. The committee adjourned without action.

Colonel Anderson pointed out that the tentative draft now under discussion took many powers from the city and vested them in the state corporation commission. Director Sayville suggested, in lieu of the 8 per cent return asked for by the company, a sliding scale which would be an incentive to the company to give improved service, and upon which the rate might be fixed from time to time. If the city is to regulate the fare on a valuation, he thought a 6 per cent return would be sufficient to begin with, leaving the company the right to go higher if by better transit conditions it could then earn more, and that means should be provided for a reduction in fare if conditions justify it.

He urged that there must be an incentive to the company to give service, which it would not have on a guaranteed return on its investment as shown by a valuation. Mr. Trafford favored the employment of competent experts to make a valuation. Colonel Anderson questioned the wisdom of paying large sums for experts, and said that the committee, assisted by the department heads, could formulate a franchise acceptable to all. He would accept as the valuation for rate fixing the return made by the company to the Corporation Commission for taxation purposes.

Wage Cut for Track Men

A wage reduction affecting the unskilled laborers on the Washington Railway & Electric Company, Washington, D. C., was recently put into effect. The cuts range from 20 to 40 cents a day and will mean a substantial saving for the company. The readjustment puts recently acquired track men, who were hired at a lower figure than those already in the employ of the company, on the same basis. The wage reduction does not affect skilled workers or trainmen.

Men Ignore Union Officials' Warning

Strike in Akron Repetition of Old Story of Unreliability of Promises from Union

Eleven hundred employees of the Northern Ohio Traction & Light Company, Akron, Ohio, went on a strike Thursday, May 5, following the vote rejecting arbitration. The action was taken in the face of a threat by Patrick J. Shea, representative of the Amalgamated Association, that the charters of the four local unions on the lines of the company would be forfeited.

At the close of the first day of the strike, Mr. Shea went to Detroit to confer with W. D. Mahon and members of the executive board of the National Association. The executive board wired the presidents of the four locals to return the men to work and submit the question of the 15-cent wage reduction to arbitration.

Another vote was taken and the men refused arbitration for the second time. Mr. Shea then returned to Akron and held a conference with officials of the company. He asked if the company would agree to take all the men back to work and submit the wage reduction to arbitration. The company took the position that it would not deal with the radical leaders who were instrumental in calling the strike. The company also took the position that it would not agree to the appointment of the third arbitrator by the Governor of Ohio as was suggested. After a second conference the company agreed to take back all of the men if the 15-cent wage cut was accepted.

Mr. Shea and other representatives of the Amalgamated Association attended meetings of the men Sunday and Monday at which time a secret ballot was taken on the question of arbitration. The first local to vote was the men on the Akron-Bedford-Cleveland Division. These men voted for arbitration with the string attached that either the Governor of Ohio or Mayor Herman Witter of Canton was to name the third arbitrator. The company refused to accept the proposal on the ground that the Ohio Governor was prejudiced in favor of labor organizations and that Mayor Witter of Canton is a union official. That was the situation in the strike up to Monday night.

In the city of Akron, buses and automobiles are taking care of the traffic fairly well; in Canton and Massillon the situation is considerably worse and thousands of persons have been compelled to walk to and from their work.

The public attitude with the possible exception of Massillon, where there is a Socialist Mayor, is decidedly favorable to the company. In the city of Akron, the company has received hundreds of applications for work from local residents. In addition to that many applications have come from Cleveland, Canton, Massillon, Dover, Youngstown and other cities throughout northeastern Ohio.

After the return of Mr. Shea from Detroit nothing was said by the Amalgamated relative to the revocation of the local charters.

The striking employees planned to return to work Thursday, May 12, following an agreement reached on May 10. The strikers voted on May 11 to approve the settlement. The settlement provides the men shall return to work at the proposed reduction of 15 cents an hour, pending arbitration. It is agreed that the company shall select one arbitrator, the employees one, and the Governor of Ohio, together with a man named by the company, shall choose the third arbitrator.

The points to be arbitrated are the hourly wage rate to be paid after May 1; the minimum work-day hours on interurban divisions; the maximum work-day hours on interurban divisions and the merit and demerit system of discipline in regard to Akron, Bedford & Cleveland and the Akron, Kent & Ravenna divisions. The company has named Charles Currie as its arbitrator. The first session is to be held within five days and the finding of the board is to be retroactive to May 1.

Men Reject New Orleans Wage Cut

The wage scale in the two-year contract under which the motormen, conductors, track workers, pitmen and carhouse employees of the New Orleans Railway & Light Company, New Orleans, La., are now working, is to be materially reduced. Under the contract with the Amalgamated Association the scale may be readjusted on July 1, 1921, when the first year of the agreement expires, upon sixty days' notice given by either party to the contract.

Receiver O'Keefe, it has developed, sought to bring about a reduction in the pay of the men and to this end has addressed a communication to the union. Neither the union officials nor the receiver will discuss for publication the extent of the proposed wage cut.

At a meeting of the union employees held on May 6 the wage cut of the receiver, reported to be 13 cents an hour, was unanimously voted down.

If the proposed wage change be not effected by May 16, a provision in the contract stipulates that the wage question shall be submitted to arbitration, both sides to be bound by the findings of the arbitrators.

In discussing the matter the receiver said:

> As the present wage scale was fixed last summer during the peak of high prices, and as the cost of living has been and is still coming down, I felt that it was proper to effect a revision of wages before July, 1922, unless the wage scale shall be readjusted by notice given not later than May 1, 1921. I have accordingly given the notice required.
>
> I have to pay track and other common labor 43 cents an hour, while the city contractor is doing similar work with the same type of labor at 25 to 30 cents an hour.
>
> Annual revision of wages is provided in the contract and upon failure to agree arbitration follows. The question, therefore, will be settled in an orderly manner as the parties have agreed upon in the contract.

City Must Perform Purchase Contract

Federal Court Upholds Puget Sound Company's Appeal for Specific Enforcement of City Contract

In a memorandum handed down in the Federal Court at Seattle, Wash., Judge E. E. Cushman denies the motion of the city of Seattle to dismiss the suit of the Puget Sound Power & Light Company to enforce specific performance of the city's contract for the purchase of the railway system from the power company for $15,000,000.

The complaint, which the city moved to have dismissed, would also prevent any taxpayers from suing the power company in the Superior Court, or in any court other than the United States Court of this district. The suit of the Puget Sound Power & Light Company was filed in February following a suit in the Superior Court brought by a number of taxpayers seeking to prevent the city from payment of gross revenues of the railway into a special interest fund, until the expenses of maintenance and operation had been paid.

The Power Company was not named as a defendant in this suit. It immediately brought suit in the Federal Court and obtained a temporary restraining order to prevent the city from using any of the revenue in the interest fund for any other purpose than the payment of interest on the $15,000,000 bonds.

The taxpayers in the Superior Court obtained a temporary restraining order against the city treasurer that prevented him from paying the gross revenues of the line into the interest fund, but this was dismissed on hearing, and the money for the March, 1921, payment was forwarded to New York. On Feb. 21 the temporary restraining order was obtained by the power company in the Federal Court to prevent diversion of the gross revenue of the railway to any fund until after the interest on the bonds was paid. The affidavit of the city treasurer setting forth the payment of the money was used by the city in its motion for dismissal in the Federal Court case.

In his decision, Judge Cushman said:

> There doubtless is a question as to the propriety of considering the showing made by the affidavit on a motion to dismiss the bill; but, if the cause has become entirely moot by the payment of the installment of interest due on March 1, in the interests of the public and the court it would be the latter's duty to consider such a question at any stage of the proceeding, however, presented or suggested, and if it is certain that only a moot question remains to dismiss the suit in order to devote the time and effort which would be required for its consideration to other public business.
>
> Upon the motion to dismiss the defendants contend that there is an adequate remedy at law; that the questions involved have become moot because of the payment March 1, after the institution of this suit, of the interest then falling due. They further contend that no duty devolved upon the defendant city of Seattle to set aside and create, a calendar month prior to March 1, a special fund to meet such interest.
>
> Logically the last contention should be first considered for, if the defendants are right in that, it obviates any necessity for considering the other questions.

Ohio Interurbans Announce Wage Cuts

Arbitration of the wage differences between trainmen and the Cleveland, Painesville & Eastern (two divisions) and the Eastern Ohio Traction Company (two divisions), two interurban companies operating into Cleveland, will begin within the next ten days. Both these roads now pay their men 55 cents an hour for the first three months' service; 58 cents an hour for the next nine months and 60 cents an hour thereafter. Some time ago trainmen on these two lines were notified that the financial condition of the roads and general business conditions would make it necessary for the company to reduce the trainmen 12 cent an hour in each classification. The men refused to accept the cut and arbitration is to result.

Motormen and conductors employed by the Ashtabula Rapid Transit Company have had their pay cut, starting on May 1, from 45 cents an hour for the first four months, 47 cents an hour for the next eight months and 60 cents an hour after the first year, to 40, 42 and 45 cents an hour.

No definite settlement has as yet been reached between the Cleveland, Southwestern & Columbus Railway and the trainmen, who have so far opposed the company's announced wage reduction of 20 per cent.

Legislative Committee Finds Railroad Commission Efficient

The investigating committee of California Senators and Assemblymen, organized to report upon the recent complaints against the State Railroad Commission, has submitted its findings. Though some errors were found to have been made by the commission the committee claims the commission's record of efficient service is an enviable one. It is believed now that all misunderstandings have been cleared and co-operation between the people and the utilities and the utilities and the commission will be the result of the public hearings during the months of January and February at Sacramento, San Francisco, Los Angeles and other important centers of the State where protests against the commission were very strong.

In its finding the committee lays special stress upon the effect on the public mind of the abrogation of contracts existing at the time of the passage of the public utilities act. Though many contracts were abrogated by the commission the committee finds that the commission acted wisely and that failure to enforce the theory would have worked a hardship on certain consumers, for it is a sound principle that "all" consumers receiving the same class of service should be compelled to contribute alike to that fair return." The committee believes that a standard form of contract for service should be formulated by the commission to contain a provision showing that rates therein set forth are subject to change by the commission.

The committee further recommends that all literature relating to the sale and advertising of the stocks, bonds, etc., of any public service corporation be supervised by the commission and that nothing in that literature be permitted which can be construed by the public as being an indorsement or guarantee of the securities by the commission. The committee finally recommends that the commission more strictly enforce the penalties provided by the public utilities act and of the rules of the commission more particularly with regard to overcharges for extensions and service.

Navy Secretary Guest of Britton I. Budd

When Edwin Denby, Secretary of the Navy, went to Chicago on May 2 for the purpose of inspecting the Great Lakes Naval Training Station, he and party were taken to the naval station from Chicago and return on a special train of the Chicago, North Shore & Milwaukee Railroad as the guest of Britton I. Budd, president.

BRITTON I. BUDD AND SECRETARY OF THE NAVY DENBY AT GREAT LAKES NAVAL TRAINING STATION

The train carrying the party was made up of three diners with a car of boy scouts attached. Luncheon was served en route and the cars then converted into chair cars for the remainder of the north-bound ride and the return trip.

Among other prominent men in the party were Captain D. W. Wurtzbaugh, commandant Great Lakes Naval Training Station; General John A. Le Jeune, commanding officer United States Marine Corps; Mayor William Hale Thompson; C. R. Francis, Commissioner of Public Works, Chicago; W. H. Finley, president Chicago & Northwestern Railroad; Fred Upham, treasurer Republican National Central Committee, and Wythe Denby, brother of the Secretary.

On returning to Chicago in the evening the Secretary attended a reception in his honor at the Union League Club which was conducted under the direction of Mr. Budd as general chairman of the club's public affairs committee and John Benham, vice-president of the International Register Company, as chairman of the sub-committee on army and navy entertainment.

Co-operative Benefit Association Organized

Employees of the International Railway, Buffalo, N. Y., have organized the I. R. C. Co-operative Benefit Association, patterned after the Co-operative Welfare Association of the Philadelphia (Pa.) Rapid Transit Company. Herbert G. Tulley, president of the International, which now is being operated by the Mitten Management, Inc., says a number of employees recently asked the company to assist them in obtaining insurance protection under the group plan, and out of the suggestions presented the management has caused the organization of the new association.

Every employee of the company who has been in service six months or more is eligible to membership and will have the opportunity to obtain a life insurance policy for $1,000 and to participate in the sick benefits. The dues are $1 a month and for every dollar paid in by the members the company will contribute an equal amount.

President Tulley explains the principal object of the new organization is to promote true co-operative effort between the management and employees. The affairs of the association are to be managed by a board of trustees consisting of members elected from the various departments of the company. One-half will be chosen by the members and the other half appointed by the company.

Wages Cut Pending Arbitration

Pending a wage settlement before a board of arbitration the East St. Louis & Suburban Railway and the East St. Louis Railway on May 1 reverted to the wage scale that was in effect prior to May 1, 1920.

The receivers of the Alton, Granite City & St. Louis Traction Company, which includes the Alton city lines, have notified the employees that wages will revert on May 15 to the scale in effect prior to May 1, 1920. The number of employees on all the lines mentioned is about 550.

The interurban employees, who have been receiving 59½ cents an hour, are reduced to 53 cents. They have asked for an increase to 85 cents. The city line men have been receiving 70 cents an hour, and are reduced to 46 and 50. They have requested an increase to 90 cents.

The board of arbitration is composed of C. E. Smith for the companies and Hunter B. Keigh for the employees, with the third arbitrator still to be selected.

Third New York Wage Arbitrator Chosen.—Former Supreme Court Justice Arthur E. Sutherland, Rochester, has been chosen third member of the board of arbitration to settle the differences which have arisen over wages between the New York State Railways and its employees.

Toledo Feeling Its Way

Commissioner Wilfred E. Cann at Toledo received a rebuff at the hands of the City Council when it refused to eliminate the Indiana line as he had requested in order to relieve the city system of one costly parallel line.

Progress is expected to be made on a power rate and in wage negotiations within the next two weeks. The wage contracts expired on April 1. They have not been renewed, but the platform men have not received any cut in wages.

During April the railway revenues fell off more than $300 a day over the March revenues and they were more than $300 a day less than February revenues.

The stabilizing fund fell below the fare increase mark when reports were made on May 10. However, the ordinance provides that the fare shall remain at the 6-cent level for six months.

West Penn Wages Reduced

Wages on the Coke Region, McKeesport and Allegheny Valley Divisions of the West Penn Railways, Pittsburgh, Pa., have been reduced 5 cents an hour effective May 1. The wages formerly paid were:

First three months	64	cents
Next nine months	68	"
Thereafter	70	"

The scale of wages, effective May 1, reduces these figures to:

First three months	59	cents
Next nine months	63	"
Thereafter	65	"

On the Kittanning, Leechburg and McDonald Divisions the rates were reduced 9 cents an hour. The rate formerly paid was:

First three months	63	cents
Next nine months	67	"
Thereafter	69	"

The new rate which went into effect on May 1, reduced these figures to:

First three months	54	cents
Next nine months	58	"
Thereafter	60	"

The reduction in wages was accepted by the trainmen without comment.

Consistency, Thou Art a Jewel!

A situation has arisen in Chicago which places the city administration in an embarrassing position. Some months ago the City Council in furtherance of its fight on increased fares took the stand that the local railway companies had violated the terms of the ordinance under which they operate and that they no longer have any legal right to exist. More recently the city became interested in a movement to have a "pageant of progress" in Chicago late in July, the exhibits to be placed on the municipal pier. The Chicago Surface Lines has a loop on an upper deck of this pier. Mayor Thompson, as a citizen and as president of the pageant association, applied to the Public Utilities Commission to compel the railway to remove these tracks to a lower level. Inasmuch as this would involve an expenditure of about $200,000, the Surface Lines resisted this petition. It points to the fact that Mr. Thompson as Mayor claims the company is operating without authority, while as president of the pageant association he had to recognize the company's existence. The commission will pass on the matter at an early date.

New Interurban in New Orleans

Negotiations that have been going on for some time between prominent property holders of the St. Bernard parish and business men of New Orleans, La., with large interests in industrial plants located in that section, culminated recently in the announcement that the Orleans-Kenner Interurban Electric Railway will be extended to St. Bernard parish. The road now operates between New Orleans and Kenner, La., in Jefferson parish.

The purpose of the extension is to give the Orleans-Kenner line, as the road is known locally, the right to traverse New Orleans through to Shell Beach in St. Bernard parish, a distance of about 30 miles. This will make a 46-mile line from Kenner in Jefferson parish to Shell Beach, St. Bernard parish.

H. K. Johnson, builder of the Orleans-Kenner electric interurban, who has recently resumed active management of the property, will undertake the construction of the proposed extension. Rights of way and the necessary financial assistance have been pledged by Mr. Johnson. A committee has been appointed to map out a route and secure the balance of the rights of way and to apply formally to the City Commission Council for a franchise for the new line.

Receiver Urges Municipal Ownership

If the city does not purchase the property of the Ashtabula (Ohio) Rapid Transit Company, the road will, by fall, be sold for junk and the tracks torn up. This is the opinion of Charles Currie, Cleveland, one of the receivers of the company. Mr. Currie, in company with A. R. Raymer, Pittsburgh, the other receiver, appeared before City Council recently and said he did not make the statement about scrapping the line with the idea of driving the city to purchase the property, but he gave this as his honest opinion of what will be done in case the deal that is proposed with the city does not go through.

Mr. Currie drew attention to the fact that the company had reduced the selling price of the property $81,000 from the price of $296,000 at which it was offered to the city at the time the deal for it was first contemplated, and after which the electors of the city voted a $350,000 bond issue to buy the road and procure additional equipment and make necessary repairs. The last proposal of the receivers is that they will dispose of the property for $215,000.

Paving Costs Reduced in New York

One of the important bills passed by the New York Legislature at the last session and signed by Governor Miller amends Section 178 of the Railroad Law in relation to paving and repair of streets. The change consists of the following insertion: "but nothing contained in this section shall require any street railroad corporation to make pavements or repairs over openings made in the streets by any person, municipality or corporation other than such street railroad corporation, for any purpose other than the pavement or repavement of the street." Under this provision the electric railway companies will not be required to lay pavements or make repairs to pavements over openings made in the streets by any person, municipality or corporation for the construction or repair of sewers, water mains or any other similar subsurface work.

Matthew Brush Testifies in Investigation

The special committee of the Massachusetts Legislature, which is investigating alleged irregularities in the passage of street railway legislation in 1918 and 1919, has been granted an extension of time to May 16, for filing its report. All witnesses have been heard, practically every member of the two Legislatures having appeared voluntarily. Matthew C. Brush, former president of the Boston Elevated Railway, testified, as did also several bankers and brokers.

Mr. Brush was easily the star witness. With that same engaging frankness and refreshing good nature which so often in the past has disarmed hostile and unjust criticism of the railway management, Mr. Brush recited in great detail the steps leading up to the enactment of the so-called public control bill of the Boston Elevated. He told of his own strenuous efforts to convince the members of the Legislature of the necessity for relief for the elevated, and as far from denying having met and talked with legislative members at clubs and at private homes, he said it was his job to talk to everyone, from newsboy to Governor, anywhere he could get hold of them. He strenuously denied, however, that any money, gifts or inducements of any kind were offered to influence votes. He knew of no members speculating in street railway stock at that time, and was positive that if they did so it was not on the suggestion or under the influence of the railway management.

As a result of the questioning of former legislators it was found that out of several hundred members only about twenty-five or thirty were involved in the stock speculations, some of these having purchased Boston Elevated securities, others Massachusetts Electric, and a few "took a flyer" on both. They were about equally divided between Republicans and Democrats, and many of them were opponents of the legislation in question, and voted against it. During the whole course of the testimony no witness showed any connection between the railway managements and the stock speculations of the legislators, nor was there any allegation of improper influence or inducements offered by the railway managements.

Speculation is rife in political circles as to what recommendations the committee will make in its report as to possible action to be taken against those men who bought railway stocks and then voted on bills affecting their financial status. It is generally believed that the committee may turn the evidence over to the District Attorney for such action as he may see fit. Some elements are demanding that members should be expelled who speculated in the stocks and are still in the Legislature.

Provision Recommended for Municipal Ownership

Without a dissenting vote, the sixteen members of the committee on municipal and parochial affairs of the Constitutional Convention, now sitting in Baton Rouge, La., has favorably reported an ordinance which gives the city of New Orleans the right to own and operate all of its public utilities, expropriate them and conduct them under municipal ownership. Commissioner Paul Maloney, of the Public Utilities Committee, expressed his pleasure on learning that the measure had been approved by the committee and remarked that in case of its adoption by the convention, means would be available to the city of New Orleans to call municipal ownership to its aid whenever the need arose for such action.

Be Sensitive to Suggestion If You Would Rise

Words of advice from octogenarians on "how to live long and happily" usually fall on deaf ears. But a suggestion on how to be of greater service from the "man higher up" on the job is not always to be spurned. Such a piece of literature is "The Thing That Will Count Most If You Want to Be Promoted," a reprint of an interview with Samuel Insull, president of the Commonwealth Edison Company, Chicago.

In a simple and interesting way Mr. Insull tells of his own early experience. A perusal of it will encourage the countless number of employees who enter business with little or no equipment and will give those who are endowed with special qualities and accomplishments an insight into how high they can mount. To do more than what is expected of you is no new rule for success. Conductors and motormen of railway properties who do a trifle more than their fellow employees in the way of courtesy and are a bit more solicitous for the safety of the patrons eventually find themselves in line for positions higher up.

Wages Reduced in Grand Rapids

Wages for trainmen of the Grand Rapids (Mich.) Railway were reduced 10 cents an hour according to the terms of the new agreement recently signed which expires May 1, 1922. The rates were formerly 56 cents an hour for the first three months, 58 cents for the next nine months and 60 cents an hour thereafter with 5 cents additional for safety car operators. The new scale now in effect is 46 cents, 48 cents and 50 cents, with 5 cents extra for safety car operators. Overtime work will be paid for at the rate of 10 cents an hour additional, with a minimum overtime pay of one hour. The open shop principle was continued as a clause of the agreement. The contract in effect last year made it compulsory that trainmen should work not to exceed six days in any one week. In the new agreement this is made optional with the employee, who may now work seven days a week, permitting his one day a week off to accumulate so that he may take his time off all at one time, or he may work continuously without any time off.

News Notes

New Franchise Drafted.—The City Council of Galesburg, Ill., recently agreed upon a franchise ordinance for the Galesburg Railway, Lighting & Power Company. The company has been operating for some time now without a franchise because the City Council could not agree on a new one. The franchise as now drafted provides for extensions of car line and includes some agreement for service on the part of the company over the track which the city proposes to build to Lincoln Park.

Wages Undisturbed Pending Negotiations.—The officials and members of the Amalgamated at Pittsburgh, Pa., on April 28, provisionally accepted a proposition from receivers of the Pittsburgh Railways that they continue in effect present wages and working conditions for one month while negotiations are continued. The wage scale expired at midnight on April 30. The extension will continue it in force until June 1. Conferences have been proceeding between the receivers and the men's wage scale committee, the working conditions being under discussion. The wage question has not been brought up, neither side indicating to the other that it had anything to suggest.

Mayor Urges Municipal Ownership.—Mayor Marshall of St. Joseph, Mo., has come out for municipal ownership of public utilities. In his recent annual message the Mayor said: "Our citizens should bear in mind that we can buy approximately $14,000,000 of public utilities and our taxes be not raised a cent. The last Legislature gave us the right to assess 20 per cent of our valuation to buy public utilities and the expenses and interest charged directly against the utility and not the city, so that we can, if the electors and your honorable body desire, take over the street railway, the gas company and waterworks, and I believe it is time to start on these improvements and acquisitions. We should do it now and not let it drag."

Programs of Meetings

New England Street Railway Club

The New England Street Railway Club will hold its next meeting in Hartford, Conn., on May 18, in a joint session with Company Section No. 7 of the Connecticut Company. It is planned to have the Boston members take the 9.15 a.m. train from the South Station, members at Worcester, Springfield and other places being picked up en route.

An informal luncheon will be served between 12 and 2 p.m. at the Weathersfield carhouse in Hartford. At 3:30 p.m. a short talk on "Appraisals" will be given by E. Irvine Rudd, chief engineer of the Connecticut Public Utilities Commission, followed by a moving picture exhibition.

The dinner will be held at 6:30 p.m. at the Hartford Club. The subjects of the talks have not been announced, but Richard T. Higgins, chairman of the Connecticut Public Utilities Commission, and Lucius S. Storrs, president of the Connecticut Company, have promised to speak.

Southwestern Electrical & Gas Association

At the Street & Interurban Railway sessions of the Southwestern Electrical & Gas Association Convention, which will open on May 18 at Galveston, Tex., notice of which was made in the ELECTRIC RAILWAY JOURNAL, issue of May 7, subjects of great interest to the industry will be discussed in an informal way. They are as follows:

Modern Fare-Collection Methods and Their Relation to Accident Prevention, Alves Dixon, superintendent El Paso (Tex.) Electric Railway.

The Desirability of the Universal Adoption of a "Front Entrance" for all Cars, Both Single and Double-truck, as a Means of Safer and Quicker Service to the Public. C. O. Birney, Inventor of the "Safety Car."

The Inspection of Cars on a "Mileage" Basis Instead of on a "Time" Basis, F. J. Bennett, Houston (Tex.) Electric Company.

The Urgent Necessity of Greater Economy and Efficiency in Car Lubrication, Walter Silvus, superintendent of equipment, Texas Electric Railway.

The Economy and Efficiency of the Substitution of "Ball" or "Roller" Bearings for the Ordinary "Friction" Bearing, J. T. Porter, Northern Texas Traction Company.

General Track and Roadway Problems of the Minute. A "Round-the-Table" Discussion for all Attending.

The Advantages of the "Bow" or "Pantagraph" Trolley Collector over the Ordinary Trolley-Wheel, A Manufacturer.

A Practical Experience in the Use of "Telephone Dispatching" on City Lines, W. W. Holden, superintendent of transportation, San Antonio Public Service Company.

Where It Is Economical to Substitute Steel Trolley Wire for Copper or "Composite" Trolley Wire, L. E. Delf, Electrical Engineer Northern Texas Traction Company.

Modern Car-Painting Methods, Round-the-Table Discussion.

Training the Supervisory Forces, the Chairman.

Financial and Corporate

Missouri Tax Upheld

U. S. Supreme Court Rejects Plea of Interurban with Respect to Method of Fixing Tax Value

The contentions of the St. Louis & East St. Louis Electric Railway in its case against the State of Missouri in the matter of a tax levied on its property were denied by the Supreme Court of the United States in an opinion handed down on May 2.

The electric railway, known as the Bridge Electric Company, was the owner in 1906 of 0.865 of a mile of electric railway constructed upon and extending from the easterly to the westerly end of the Eads Bridge. In that year the Missouri State Board of Equalization valued the portion of this railroad which was within that state at $186,019 and levied a tax upon it for state and local purposes. The Bridge Electric Company contested the tax and sued to recover the amount collected, charging that the tax is invalid on the ground that it constitutes a direct and unconstitutional burden on interstate commerce.

$500,000 PER MILE

The state statute provided that in valuing railroads for taxation the State Board of Equalization should determine the total value of the entire property in the state, tangible and intangible, of each company and that from this total it should deduct the value of all its tangible property and then "enter the remainder upon the assessment list under the head of 'all other property.'"

The Board of Equalization valued all the rolling stock, poles, wires and cash of the Bridge Electric Company at $32,630; the road-bed and superstructure at $5,000 per mile and "all other property" at $500,000 per mile, making a total value per mile of $537,630.

There were 0.346 of a mile of the track in the State of Missouri and this proportion of the total value per mile, amounting to $186,019 (of which $173,000 was included under the item "all other property"), was the amount on which the disputed tax was levied.

It was not contended that this valuation was unreasonable in amount but only that the property of the company which was valued as "all other property" consisted solely of its franchise to conduct interstate passenger traffic over the interstate bridge and that, therefore, the tax so far as levied on the valuation placed on the property is concerned, is a direct tax and burden on the right to engage in interstate commerce and thus unconstitutional.

The Supreme Court states, however, that "the stipulation on which the case was tried does not sustain this contention."

In concluding the court says:

> We cannot doubt that the contracts we have described, which very plainly gave to this short-line of railway much of the value as a going concern which led the company to bond and capitalize it at $1,000,000 and the board to value it at approximately one-half that amount, must have been taken into consideration by the board and that, therefore, the contention that the tax was levied exclusively upon the franchise to do an interstate business is not sound and must be rejected.

The opinion of the court was delivered by Justice Clarke.

Large Saving on Labor in Kansas City

Continuous and steady improvement in earnings, under the receivership, is reported for the Kansas City (Mo.) Railways. Despite bad weather and a definite amount of unemployment gross revenue is maintained at a substantial level compared with former similar periods, and there is a constantly bettering relation between revenue and expenses.

One item that offers interesting opportunity for comparison is that of labor cost. The company is operating the largest number of cars in its history, 720 on the high peak of schedules, with 900 fewer employees than a year ago. Several developments make this condition possible. Changes in the power plant, including installation of an ash carrying equipment, reduce the labor requirement there. In the shops 100 fewer men are employed than a year ago; last year the shop was loaded to capacity in the repair and overhauling of cars, and equipment was put into first class shape.

More Representative Name Chosen

The directors of the Monongahela Valley Traction Company, Fairmont, W. Va., have voted to change the name of the corporation to Monongahela Power & Railway Company and not the Monongahela Traction & Light Company, as noted in the ELECTRIC RAILWAY JOURNAL for May 7, page 874.

Officers of the company state that the change is brought about by the fact that the power and lighting departments of the concern have been growing by leaps and bounds not only along the lines of the interior, where great power houses have been built and the company is moving large quantities of coal and other freight, but on the lines in Parkersburg and along the interurban as well. The change of name it is believed will be to the interest of the company as it relates to the chief department of the corporation, and it will improve the market for the securities of the company.

End of Receivership Urged

City Says Pittsburgh Railways Is Rebuilding Lines Out of Earnings at Ten-Cent Fare

George N. Munro, special solicitor for the city of Pittsburgh, Pa., in charge of utility legislation, declares that the Pittsburgh (Pa.) Railways during the year 1920 earned more than $2,000,000 over and above operating requirements and that the surplus fund, swelled on account of excessive fares, has been used for improvements and betterments instead of protection for creditors. A report by him to this effect urging the end of the receivership was read on May 3 before the City Council and Mayor Babcock.

The report recommends that the property be formally returned to the bondholders in view of the fact that the Public Service Commission valuation of $62,500,000 is less than the $64,000,000 of outstanding securities bearing interest. The conclusions drawn by Mr. Munro are based on statements of earnings and expenditures obtained on April 1 from the receivers and on engineers' estimates and estimates made by the receivers before the Public Service Commission.

According to Mr. Munro after an allowance of $15,986,000 for expenses, which included $985,000 for normal depreciation and an excess of $1,900,000 for wages over 1919, figured on the budget basis by engineers, the company received income ranging from $600,000 to more than $2,000,000 in excess of all expenses and a 7 per cent return depending upon the valuation accepted as a basis for figuring the earnings. The valuations on which this computation was made were taken as the figure of $48,000,000 by the city's engineer, $70,000,000 for the company's engineers and $62,500,000 found for the Public Service Commission.

Mr. Munro contended that the property was being rebuilt out of earnings and at the expense of the car rider whereas much of the work done was really a charge to capital. He argued that while it was desirable that the property be properly maintained, the public, if it was to pay for rehabilitation as well as for transportation, should have something to say about the disbursement of the excess money.

The reply of the receivers characterized the deductions made by Mr. Munro as "palpably erroneous and at best irrelevant." They contend that such improvements as were made were carried out in the interest of the car riders at the behest of the court and in pursuance of the court's policy that the service furnished by the receivers should be regarded as the paramount purpose in their administration. They characterized as lacking in every element of truth the charge by Mr. Munro that instead of using this fund to take care of unsecured creditors, for whose protection this receivership was invoked, they are building up the property out of earnings and thereby unduly continuing the receivership. According to the receivers "it is evident that no policy or action is possible to meet the divergent views of the various city officials and that no determination can be reached except by adjudication." Further the receivers say that the city has unnecessarily delayed the valuation proceedings. The receivers recite that in March, 1920, the State Public Utilities Commission fixed the valuation of the company at $62,500,000, but that the city waited about six months, or until near the expiration of the time for filing an appeal from the decision of the commission, before its representatives took an appeal to the Superior Court. Argument was set for April 15, 1921, but as that date approached a postponement was asked and granted over the protest of the receivers.

On May 6 a conference was held with members of the Council at which the receivers were asked to attend to discuss the possible reorganization of the railway. At that conference a letter was read which had been written by Mr. Munro to Solicitor Pritchard. In this communication Mr. Munro said that the receivers "instead of coming back at us with equally conclusive evidence content themselves with making a general denial." He confessed himself disappointed at the answer of the receivers, and was "inclined to think that their reply is a studied effort to confuse the issue." "In short," said Mr. Munro, "you will notice they made no effort to give any items to substantiate their reply." He also says the company is in error with respect to the delay by the city in the proceedings before the court.

Briefs Filed in Lease Case

The city of Philadelphia has filed a brief in the Supreme Court of that State setting forth the position taken by the city in appealing against a decision of the Superior Court to the effect that the Public Service Commission has no authority to inquire into the rentals paid by the Philadelphia Rapid Transit Company to the underlying concerns. The printed briefs were filed by the city preparatory to the argument, in which the same contentions are raised as were made in the Superior Court. Briefs on behalf of the Philadelphia Rapid Transit Company and its subsidiaries were also prepared for filing.

The Rapid Transit Company is paying to the underlying companies rentals amounting to approximately $10,000,000 a year for the use of their franchises. The city maintains that the Public Service Commission has the right to ascertain whether or not these rentals are excessive, whereas the Superior Court has ruled that inquiry into this matter is not one of the commission's lawful functions.

The city bases its appeal on the dissenting opinion of Justice Keller, who did not agree with the majority of the Superior Court in deciding in favor of the underlying companies.

$1,000,000 Increase in Gross

Prospects Are that North Shore Road Will Profit Materially by Decreasing Cost

An increase of $955,748 in gross operating revenue of the Chicago, North Shore & Milwaukee Railroad is shown in the annual report for the year ended Dec. 31, 1920. Despite this very favorable showing made by the company in securing new business, the net operating revenue as compared to the previous year increased only $46,164 and the net income $1,172. The accompanying consolidated income account shows the comparison with the year 1919 for the various items.

	1920	1919	Increase
Gross operating revenue	$4,193,669	$3,237,921	$955,748
Operating expenses	3,229,048	2,319,464	909,584
Net operating revenue	$964,621	$918,457	$46,164
Taxes	151,746	163,101	11,355*
Operating income	$812,875	$775,356	$57,519
Miscellaneous income	10,332	17,879	7,547
Gross income	$823 207	$773,235	$49,972
Fixed charges	390,196	341 396	48,800
Net income	$433,011	$431,839	$1,172

* Decrease

The consolidated income statement for the years 1916 to 1920 inclusive forms an interesting exposition of the manner in which the business of a railroad may be built up by bettering the physical property and giving high grade service.

The report reviews briefly the operating conditions pertinent to the financial statement and also the physical improvements made in the property during the year. It was pointed out that the increase in the gross operating revenue was almost all absorbed by the increased cost of labor. The improved service resulting from the operation of safety cars on the city lines of Waukegan, Ill., brought an increase in revenue on those lines of 39 per cent, and for the first time they are showing a tendency toward becoming self-sustaining. The rate of fare on both the Milwaukee city lines and the Waukegan city lines was increased from 5 cents to 6 cents during the last half of the year. On Sept. 1, 1920, the interstate rates on the interurban lines were increased from 2.5 to 2.7 cents per mile and on Nov. 1, 1920, to 3 cents per mile. On Sept. 17 an increase of approximately 33⅓ per cent in freight rates became effective.

	1916	1917	1918	1919	1920
Operating revenue	$1,157,191	$1,751,373	$2,899,975	$3,237,921	$4,193,869
Operating expenses	714,887	1,114,512	1,856,038	2,318,464	3,229,048
Net operating revenue	$442,304	$636,861	$1,043,937	$918,457	$964,621
Taxes	66,038	95,680	185,822	163,101	151,746
Operating income	$376,266	$541,181	$858,115	$755,356	$812,875
Miscellaneous income	6,208	4,858	9,470	17,879	10.332
Gross income	$382,474	$546,039	$867,585	$773,235	$823,207
Fixed charges	237,996	266,580	332,056	341,396	390,196
Net income	$144,478	$279,459	$535,079	$431,839	$433,011

The amount expended during the year for additions and betterments and for reconstruction was $1,338,079, of which $800,000 was for new equipment contracted for in 1919. During the year the company authorized and issued $1,500,000 of ten-year 7 per cent sinking fund notes secured by first mortgage bonds, of which $707,400 were issued in 1920. The company paid off and cancelled $600,000 of collateral notes and $72,000 of equipment notes and purchased and cancelled $27,000 of the ten-year sinking fund notes.

Among the physical improvements mentioned in the report are the construction of 9,982 ft. of new sidings at sixteen locations in Illinois and Wisconsin; the construction of 4,500 ft. of new roadway, paved with brick on concrete base, and paralleling the old roadway, in order to make room for the double tracking of the line at this point; the widening and ditching of cuts and placing of 4,358 lin.ft. of drain tile; the replacement of 65-lb. rail on ten miles of single track with 80-lb. rail; the renewal of 20,000 ties; the placing of 47,000 cu.yd. of ballast; the surfacing of 26 miles of single track; the rebuilding of ten miles of right-of-way fence; and the erection of a new substation building at Ravinia for which there was purchased and installed an automatic controlled 1,000-kw. rotary converter.

During the year an Employees' Mutual Benefit Association was formed. The members of this organization will receive a sick benefit of $6 a week and a death benefit of $300. Each member pays $1 a month and the company contributes 50 cents a month per member toward the support of the association, which now has a membership in excess of 500.

An enlargement of the safety organization and the development of a fine spirit of co-operation on the part of all employees not only in accident prevention work but in closer observance of rules and a desire to give the public the best of service is pointed out as one of the features of the year's progress. There were held 134 meetings of employees to promote safety.

$4,936,976 Fixed as Lynchburg Value

Elements of Value Include Reproduction Cost New Dec. 31, 1916, This Cost Appreciated 10.8 per Cent, Actual Cost of Additions During War Period, and Developmental Costs

A. L. Drum & Company, consulting engineers, Chicago and Philadelphia, representing the Lynchburg Traction & Light Company, Lynchburg, Va., filed with the Corporation Commission of the State of Virginia on May 10 a final report on the cost of reproducing and developing the properties of the Lynchburg company. The valuation was made in accordance with the principles set forth by the Corporation Commission in its opinion of March 18, 1921, acknowledging the application for increase in light and power rates.

THE report comprises (a) the cost to reproduce the physical property as of Dec. 31, 1916, based on average prices prevailing from 1912 to 1916 inclusive; (b) cost to reproduce the physical property as of Dec. 31, 1916, based on 10.8 per cent normal appreciation to Feb. 1, 1921; (c) actual cost of additions to property from Jan. 1, 1917, to Feb. 1, 1921, and (d) developmental costs.

The basis of the valuation as prescribed by the commission excluded the use of abnormal war prices except actual expenditures made under such conditions. The opinion of the commission provided that "to the probable fair 1914 reproduction value may reasonably be added a normal appreciation for the years since that time. Had there been no war there would have been a gradual rise in prices due to increasing costs of production. Thus we have a basis which allows the company the benefit of appreciating values in normal times, based on pre-war values plus actual additions made at war prices."

The engineers, in conforming to this ruling, assumed that the average unit prices prevailing for the five-year period from 1912 to 1916 inclusive would represent fair average prices prevailing as of June 30, 1914, and applied such to the Dec. 31, 1916, inventory of the physical property. The appreciated value was derived by increasing the 1912-1916 valuation by 10.8 per cent, this being 1.57 per cent per annum compounded for six years and seven months. It was derived from price indices on about 340 commodities for the sixteen years from 1900 to 1915 inclusive. The trend of prices over this fairly uniform period of rising prices indicated an increase of 1.57 per cent per year compounded, and was held to represent a fair index of normal appreciation in values. A chart showing the price indices of commodities and the derivation of the 1.57 per cent is attached to the report.

The treatment of developmental costs is of particular interest as it embraces three main subdivisions: (a) Expenditures for obsolete equipment and construction; (b) cost to unify the system; (c) losses during the early years of operation. The total developmental costs as reported equaled about 16 per cent of the valuation of the physical property.

The expenditures for obsolete equipment and construction comprised the depreciated value of the property at the time of supercession and was subdivided as between the railway, electric light and gas departments. The developmental costs under the railway department represented superseded horse car lines, power stations, car houses and original electric cars. Under the electric light department the developmental costs included superseded power station equipment, transmission lines and street lighting equipment destroyed prior to the end of its useful life due to consolidations and changes in the art. Reliable data covering superseded property in the gas department were unavailable and as that superseded was known to have had a normal life no claim was made for developmental costs in this department.

The cost to unify the system represented an estimate of the cost incident to the creating and consolidating of the various thirteen companies comprising the present Lynchburg Traction & Light Co. It was derived after an investigation of such records of the companies as were available.

The losses during early operation represented the deficit of return on the investment during the early period of operation up to the time the business had become established on a paying basis. A summary of the cost of reproducing and developing the property as of Feb. 1, 1921, is given in the accompanying table.

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE LYNCHBURG PROPERTY AS OF FEB. 1, 1921

	Railway Department	Electric Light Department	Gas Department	Total
Physical property:				
Estimated cost to reproduce the physical property as of Dec. 31, 1916, based on average prices, years 1912-1916, inclusive	$1,328,998	$1,714,295	$582,806	$3,626,099
Estimated cost to reproduce the physical property as of Dec. 31, 1916, based on 10.8 per cent normal appreciation to Feb. 1, 1921	1,472,530	1,899,438	645,749	4,017,717
Actual cost of additions to property Jan. 1, 1917, to Feb. 1, 1921	49,476	73,224	112,464	235,159
Total cost to reproduce the physical property as of Feb. 1, 1921	$1,522,000	$1,972,662	$758,213	$4,252,876
Developmental costs:				
Expenditures for obsolete equipment and construction	$134,503	$95,770	....	$230,273
Cost to unify system	73,794	94,328	$31,878	200,000
Loss of interest during operation	93,654	119,715	40,456	253,826
Total developmental costs	$301,951	$309,813	$72,334	$684,099
Total cost of reproducing and developing the property	$1,823,951	$2,282,476	$830,548	$4,936,976

TWENTY MILES OF RAILWAY

The accrued depreciation as reported represented the amount of existing depreciation due to wear and use as determined by inspection and measurement in the field. It is not based on theoretical depreciation due to age or obsolescence. The amount of accrued depreciation for the railway department is given as $140,203, for the electric light department as $108,640 and for the gas department as $52,635, making a total of $301,478.

The Lynchburg Traction & Light Company owns and operates the street railway, electric light and gas utilities in Lynchburg and vicinity, the street railway consisting of 19.25 miles of single track, thirty-nine passenger cars and three service cars. Power is obtained from the Ruesens hydro-electric station and the Blackwater Creek steam station, both of which jointly serve the railway and electric light departments. The generating and converting equipment devoted exclusively to the railway department aggregates 1,650 kilowatts capacity, all of which is located in the Blackwater Creek steam station.

The Ruesens hydro-electric station, located on the James River about 4½ miles north of Lynchburg, is equipped with three water wheels with a generating capacity of 2,500 kw. The dam is of cut stone masonry with concrete crest, about 425 ft. long, 32 ft. high and develops a net effective head of 22 ft.

ONE-THIRD POWER CAPACITY FOR RAILWAY

The Blackwater Creek station is a steam station of 2,000 kw. capacity, not modern in construction, and is utilized as an auxiliary plant in connection with the Ruesens hydro-electric station, to which it is connected by a new double transmission line. There are 5,335 residence, commercial and power meters in service, and 731 municipal series incandescent street lamps are connected to the system. Of the total amount of power generated, approximately 36.4 per cent is used in the operation of the railway.

The gas plant consists of three benches of inclined coal gas retorts, six retorts to each bench, also two Lowe water gas sets, with the necessary condensers, scrubbers, purifiers and residual equipment. The plant capacity is about two and one-half million cubic feet of gas per day. There is one 50,000 cu.ft. relief holder and one 200,000 cu.ft. storage holder. The distribution system consists of 41.28 miles of gas mains, with 3,752 meters connected.

New Rhode Island Company Selects Directors

Former United States District Attorney Harvey A. Baker has been nominated by Mayor Gainer of Providence, R. I., to represent the public on the board of directors of the United Electric Railways, which is soon to operate the electric railways now run by the Rhode Island Company. The election of Mr. Baker and eight other directors was recommended by the joint reorganization committee.

The other proposed directors are Zenas W. Bliss and George H. Newhall, appointed by Governor San Souci and confirmed by the Senate; Ralph S. Richards, representing the Rhode Island Hospital Trust Company, representing the holders of the general mortgage bonds; Edward B. Aldrich, Frederick S. Peck, Richard B. Comstock, Harold J. Gross, and J. Cunliffe Bullock, representing the stockholders.

At present and for the purpose of effecting a temporary organization there are five stockholders of the United Electric Railways. These will be called together soon, and are expected to confirm the choice as directors of the five men nominated to represent the stockholders.

$4,100,000 Value Placed on Interurban

The Public Service Commission of Pennsylvania in the case of the city of Erie vs. the Buffalo & Lake Erie Traction Company has found the fair value of the property of the railway to be $4,100,000. It holds that upon this sum the company is entitled to a fair return over and above its operating cost and annual maintenance. The decision of the commission is to the effect that lines of street railway track that have been abandoned and are no longer used or useful in the public service should not be included in any fair value for rate-making purposes.

The commission further holds that a power plant which is no longer used by a street railway but is leased to an electric company at an annual rental is a potential asset and will be included in a fair value for rate-making purposes. In its reproduction cost estimate the commission made allowance for overhead on real estate, depreciation and working capital. Bond discount was not allowed. The commission further said that the market value of stocks and bonds issued by an interstate corporation covering property both within and without Pennsylvania afforded no proper criterion as to the value of the property for rate-making purposes within the State.

The commission also reiterated the fact that it is well-settled law that an active going concern rendering efficient service has a greater value than an idle one and that going concern values should be considered and included in determining the fair value of a utility for rate-making purposes. Finally the commission recommended the issuing of school tickets good between certain hours and the sale of book tickets at a reduced rate.

Indebtedness Limitation Removed

In regard to the recent action by the Minneapolis (Minn.) Street Railway in removing its limit of indebtedness beyond $1,200,000, W. D. Dwyer, counsel for the company, explains:

> The limitation was put on when the stockholders had no idea of the size to which their business would grow. It would have been impossible for the company to live up to it and continue in business. No stockholder ever objected to the directors disregarding it, and if one had there is no doubt that the courts would uphold the company. It was just a dead letter—one of those laws that are never lived up to—and we decided to get rid of it.

Movement in Interest of New York Security Holders

An organization known as the Public Utility Security Holders' Association has recently been formed in behalf of the 55,000 holders of the securities of the electric railways in Greater New York. Headquarters have been established at 605 Fifth Avenue, New York, with Ernest P. Fredericks as managing director. A uniform plan of assessment consisting of 50 cents per $1,000 bond or 5 cents per share of stock has been made, with a minimum assessment of $1. The advisory board at present consists of ten members who are men of standing in their business and professional life and representative of the great majority of security owners. The members are E. H. Hicks and Henry Franciscus, Brooklyn; Bernhard Blitzer, Gustav Kimpel, C. A. Fairchild, S. H. P. Pell and Theodore Koupal, New York; E. S. Gardner, Springfield, Mass.; Wallace Pyle, Jersey City, N. J., and E. G. Hamersly, Philadelphia, Pa.

Mr. Fredericks has been identified in the past with campaigns conducted in the interest of traction security holders in Boston and in Canada.

Dayton Roads All Losing Money

That the railway of Dayton, Ohio, are facing bankruptcy was announced at a conference called to consider plans to bring about more favorable conditions among the companies there.

Harry P. Clegg, president of the Oakwood Traction line, advanced the claim that not one of the local companies was making operating expenses. The Oakwood line, which extends from East Oakwood to Daytonview, is said to have been running behind steadily for five or six years. The Dayton line has paid no dividends for four years and has met expenses by borrowing money, and the Peoples' Company, owners of several divisions, paid its last dividend out of its surplus.

Representatives of the various companies informed the City Commission that under existing conditions there was no use continuing operations. However, no plea was made for an increase in fares and it is understood there will be none.

Financial News Notes

Preferred Stock Dividend Resumed.—A quarterly dividend of 1½ per cent has been declared on the oustanding $2,300,000 of preferred stock of the Cumberland County Power & Light Company, Portland, Me., par value $100. This is the first dividend on the preferred stock since May, 1918, when 1½ per cent was paid in scrip.

Interurban and City Accounts Adjusted.—A settlement of accounts between the Cincinnati (Ohio) Traction Company and the Interurban Railway & Terminal Company has been approved in the Common Pleas Court. Under the agreement the traction company secures title to the former interurban tracks and overhead wires in the former villages of Pleasant Ridge and Kennedy Heights. The traction company is to pay the Interurban $5,000 in cash and cancel $49,000 of receiver's certificates issued by the interurban in favor of the Cincinnati Traction Company.

New Interest in Purchase by City.—The public utilities committee of the Board of Supervisors of San Francicso, Cal., has agreed to recommend that $15,000 be made immediately available for the use of City Engineer M. M. O'Shaughnessy in making the necessary study of the United Railroads properties and recommending a price at which the city can afford to take them over. Reasons urged upon this committee by various organizations for this action are: the need of (1) one fare with a universal transfer, (2) the elimination of four-track conditions on Market Street, and (3) the very large majority by which the Charter Amendment No. 30 was carried at the last election. (This amendment provides for the purchase of public utilities on the installment plan.)

Sale Ordered by Court.—Under an order issued by Judge E. B. Museout of the Forty-fourth District Court at Dallas, Tex., the properties of the Standard Traction Company, Dallas, were ordered to be sold at public outcry on May 3 to satisfy a judgment for $5,000 in favor of C. C. Farmer and wife. The Standard Traction Company owns the railway serving the Mount Auburn and Parkview additions to the city of Dallas, now leased to the Dallas Railway and being operated by that company. J. H. Power is president of the Standard Traction Company. The company was organized by the real estate firm that placed these two additions on the market. It has offered to deed the property to the Dallas Railway with the condition that through service be maintained from the business district to these additions.

Traffic and Transportation

Jitney Ordinance Works Well

Regulatory Measure in Kansas City Restricts Autos to Routes Where There Are No Car Lines

Elimination of jitneys from the streets of Kansas City, Mo., having electric railway tracks has had many beneficial effects since the ordinance became effective on April 7. The ordinance had been passed previously by the City Council, but on April 7 an order from the Circuit Court of Jackson County released a temporary injunction secured by the jitney operators, and new schedules and routes for jitneys were established.

The most striking effect of the new plan of "co-ordinate" rather than competitive operation of transportation facilities is in the relief of traffic congestion. The removal of nearly 400 jitneys that had constantly operated on street car streets is an obvious relief to traffic congestion, particularly notable in rush hours.

The improvement in the accident record directly attributable to the elimination of jitneys from tracked streets has several significant bearings. Not only is service maintained at higher efficiency but there is a noticeable reduction in repair and wreck crew costs, and in the many expensive concomitants, including litigation of accidents.

RAILWAY SERVICE INCREASED

A second public benefit resulting from elimination of jitneys from tracked streets is the marked increase in street car facilities made possible by gain in patronage. The company had promised that more cars would be operated when jitneys were assigned to streets not having tracks. Sixty-five cars were added to service on April 7; and all these have since been retained.

The number of jitneys retired has been almost exactly the same as the number of cars added. The increase in number of cars was about 10 per cent; while the increase in revenue has been about 5 per cent—this disparity resulting from the fulfillment of promise to improve service over all lines at all hours of the day.

The Public Service Commission and other regulatory bodies set the standard for service in Kansas City at 640 cars as of July, 1917; the company is now operating 720 cars.

The justice and logic of the railway company's position regarding jitneys are being recognized more clearly as time passes. The company had not been fighting the jitneys as direct competitors, it had not sought or asked their complete elimination. The company had suggested that jitneys constitute a subsidiary transportation facility. The railway contended that the jitney, being a supplementary service, should be so operated as to fulfill its function for the public benefit to the best advantage. It should be required to build its prestige and business independently, in the service to which it was best adapted and most useful, and not to secure its business directly from the railway sources of business, nor in direct competition with the railway. The company did not agitate against jitneys, nor use publicity to put jitneys in bad repute.

Before the regulatory ordinance became effective, many citizens seemed to consider that the city officials were about to destroy the jitney service, from motives of hostility. The Council and the city officials patiently bore the criticism. It is said that the receivers, representing the public as well as the company, were able to present the matter effectively to the city officials.

About fifty jitneys discontinued operations immediately upon the ordinance becoming effective. Many others, while operating on the prescribed routes, are not maintaining schedules in non-rush hours. Even in rush hours, the schedules of the jitneys are not always followed.

The regulatory ordinance was attacked by jitney operators, and a temporary injunction secured against its enforcement. Upon final hearing, Judge Hall of the Circuit Court of Jackson County, at Independence, Mo., declined to make the injunction permanent. The jitney organization has appealed to the Supreme Court from Judge Hall's decision. Judge Hall concluded his finding with these words:

> The streets of the city, under the statutes, belong to the city and are exclusively under its control. No one can use the streets for any public purpose, like the transportation of passengers for hire, without the city's consent—neither a railway company, nor a jitney owner, nor anyone else.

Communities Back Fare Increase

Suggestive Ideas Are Contained in Rate Appeal to Which Railway Won the Support of Communities Affected

Passenger rates were increased on April 20 by the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., pursuant to an order issued by the Public Service Commission of Missouri on April 2. The increase was 25 per cent. It applies to commutation as well as other passenger rates. The remarkably small amount of "legal proceedings" involved in securing the adjustment constitutes an interesting phase of the event.

THE application, evidence, opposition and support regarding the increased rate were all presented in a frank, business-like and "uncontroversial" manner. All the cards were laid on the table by both sides, with the result that there was no contention against the rate increase as a whole. The only opposition to the application appeared in the form of a request that additional elements of service be installed—elements which the company had planned and was ready to establish.

As the proceedings developed, the minor items of controversy as to rates and service were adjusted by representatives of the different communities on the basis of more equitable distribution of a recognized higher cost of operation than was provided for under the old rate.

Preliminary to making the application for the increase Robert P. Woods, vice-president and general manager of the railway, discussed with officials of communities served the road's service and the approaching necessity for improvements. A careful survey was also made of opinion as to the road's service as viewed by the communities, and public officials were reminded of the expenditures that must soon be made. The attorneys for the communities in any proceeding regarding rates were shown data as to costs of maintenance and operation and of net revenue, and were invited to examine the company's records. The exhibits upon which the company was going to base its application for an increase were shown in advance of the hearing and convinced the officials that higher rates were necessary if their communities were to receive a continuance of the service.

As a result of these conferences each community, recognizing the need of the higher rate, bent its efforts to "protecting its rights," so that its service would not suffer, and it would not bear a disproportionate part of any increase.

Mr. Woods prepared the application himself—going to the heart of the matter. Seventeen exhibits showing valuation and operation data were also prepared and presented by him. The application as he wrote it contained scarcely 1,000 words. Four short paragraphs gave the data on the history of the company and its passenger rates. One paragraph asked straightforwardly for a 2½-cent rate (a 25 per cent increase), commutation rates to be advanced in the same proportion. Another paragraph gave the reasons for the request —that the company had charged only 2 cents a mile for seven years; that this rate had been inadequate for several years; that costs had risen greatly in the period; that all surplus had been put back into the road, and that heavy expenditures would have to be made to keep the property in first-class condition. The application was filed on Feb. 25.

A statement prepared by Allen G. Hoyt, president of the company, presenting the general subject of electric line rates, was filed separately, in support of the brief application.

ONLY ONE HEARING HELD

One hearing was held by the commission. This was conducted at Kansas City on March 11. Five witnesses testified in behalf of the application—Mr. Woods and four bankers. The bankers were called to testify as to the rate of return proper for an electric railway. Colonel C. F. Enright, former bank commissioner of Missouri, one of these witnesses, said the rate of return should be not less than 8 per cent; W. P. Fulkerson, banker, St. Joseph, Mo., testified that he would not want to invest in applicant's property on an 8 per cent basis because he could do better with other securities. W. T. Kemper, chairman of the board of the Commerce Trust Company, the largest bank west of Chicago, testified that nothing less than 8 per cent would be a reasonable return and that he did not expect interest rates to decline during the next few years. Mr. Hoyt, vice-president of the National City Company, New York, said that electric light and power securities, the most attractive in the public utility field, are selling to net more than 8 per cent, and that returns on electric railways, not in great public demand, should be materially above 8 per cent. There was no testimony or argument against the 8 per cent minimum return. No further evidence or testimony was presented by the company.

The "protests" regarding the application did not in any instance attack the principle of an increase, nor question either the exhibits of the company or the conclusions drawn by the company from these exhibits. Rather were the arguments by representatives of communities confined to an effort to attain an equitable distribution of the cost of operation among the communities.

COMPANY NOT INTERESTED IN METHODS

One community, for instance, sought to secure retention of its former commutation rates, and another, which had not had such commutation rates, claimed discrimination. Other communities responded that it would not be fair to require through traffic to bear a disproportionate rate for the special benefit of an intermediate station. The company made it plain that "if the commission will provide us adequate means for carrying on the necessities we have outlined, we do not care how the commission arranges the details, and as long as there is commutation rate in one place, we don't know why there should be discrimination." As a result further suggestions were made by the communities themselves toward equalizing both rates and service over the company's lines.

Incidental to the rate hearing—as an element in the costs of operation and ability to increase service under higher rates — various communities asked improvements. As a compromise among the communities, a limited train was agreed upon for Excelsior Springs which should make one stop, at Liberty. This item of increased service, together with the commutation rate asked for Excelsior Springs, was included in the order of the commission.

The order, issued on April 2, increased passenger rates from 2 to 2½ cents a mile; increased existing commutation rates of 1.3 cents a mile to 1.625 cents a mile (the same proportion, 65 per cent, of the regular rate as before).

In reviewing the exhibits and testimony the commission pointed out that the increase of 25 per cent to 2½ cents per mile, if granted, would provide a return for all purposes in excess of 8 per cent—as the figures indicated 8.2 per cent. The commission stated, however, that this rate of return might be reduced in fact through the establishment of the commutation rates and other items of service not previously among the expenses.

The new rates went into effect on April 20 without any objection having developed over the matter or complaint being heard.

The whole proceeding reflects a gratifying co-operation of the public with company and commission for the attainment of maximum permanent service from the utility. The representatives of the communities seem to have sought such results concerning rates and orders on other subjects as would bring about the most satisfactory operation of the railway for the interests of all concerned.

Five-Cent Fare Re-established

Keokuk, Ia., went back to a 5-cent fare the early part of April of this year under its original franchise ordinance which has about ten years to run. The validity of such franchise contract was a point involved in the case presented to the Supreme Court of Iowa in the suit of the Ottumwa Street Railway against the city of Ottumwa. A decision was made at that time holding that such a clause was not binding on the railway, and pending a decision on rehearing, the City Council of Keokuk, last December, granted the Keokuk Electric Company an increase to 7 cents. Rebate slips were issued, to be redeemed if 5-cent fares were established. Apparently with the belief that the convening of the Iowa Legislature would probably result in the introduction and passage of measures of relief for the utilities and that the new court which came in on Jan. 1 might reverse the court's former decision the Ottumwa Railway applied to the Supreme Court to dismiss the appeal. This was granted and as a result the City Council of Keokuk rescinded its action in regard to the 7-cent fare and ordered the company to cash the rebate slips and re-establish the 5-cent fare.

Rehearing on Fort Wayne Fares

Robert M. Feustel, president of the Indiana Service Corporation, Fort Wayne, Ind., states the company will not oppose the rehearing on the city's petition to secure a reduction in rates. This rehearing was recently granted by the Indiana Public Service Commission. The present fare is 7 cents, four tickets for a quarter. The city is seeking a 6-cent rate, nine tickets for 50 cents. Mr. Feustel says:

> In presenting the case before the commission, the city estimated that the minimum increase in passengers hauled in 1921 over 1920 would be 500,000 and that the probable increase would be 2,000,000 passengers. Up to date this year there has already been a decrease of more than 500,000 passengers below the figure for the same period last year.

In his statement giving the reasons for asking for a rehearing the city attorney alludes as follows to the matter of maintenance:

> The city of Fort Wayne is desirous that proper service be maintained, but it believes it unjust to do an abnormal amount of maintenance work, rebuilding of lines and such in a very short time, thus taxing the present car riders more than their just burden, to satisfy the desire of the present operator to get his Fort Wayne lines in the very best possible condition at the earliest possible moment.

Hartford Indorses One-Man Car

The Common Council of Hartford, Conn., on April 25 authorized the Connecticut Company to operate one-man cars in the city indefinitely. A resolution was adopted suspending for an indefinite period that portion of the Tucker agreement, so called, of 1894, providing that there must be a crew of two men on each car. The Connecticut Company's petition, embodied in the resolution as adopted, asked that the restriction be lifted "until such time as the proper authority of the city of Hartford shall notify the Connecticut Company six months in advance of its desire to cancel such suspension."

Except for this action by the Council, the Connecticut Company would have been compelled to withdraw its one-man cars from lines within the city of Hartford on May 1. By a vote on Sept. 22, 1919, the Council gave permission for the operation of the one-man cars until May 1, 1921, explaining that "the General Assembly of the State may pass legislation concerning electric railways and by that time the electric railway situation in the State may be clarified."

The Aldermen, acting on an unfavorable report from the joint committee, had then refused to authorize the operation of the one-man cars for an indefinite period. The problem was solved, however, when the Council adopted a resolution by which the company was empowered to operate passenger cars with one man as operator within the city limits until May 1, 1921. The resolution provided that "at the expiration of this permission, if no further permission is given, *ipso facto* said provision in said agreement (the Tucker agreement) revives and becomes in full force and effect."

Cleveland Engineers Testify at Trenton Hearing

The Board of Public Utility Commissioners of New Jersey is hearing the application of the Trenton & Mercer County Traction Corporation for an increase in fare from 7 to 10 cents. The commission was asked to grant the 10-cent rate on a temporary basis, and later after considering the valuation of the company make a permanent rate.

Peter Witt, Cleveland, Ohio, testified that the company was being saved from financial ruin through the Trenton City Commission withholding its approval of jitney operations. Mr. Witt favored a 5-cent fare between the hours of 8 a.m. and 4.30 p.m., with seven tickets for 49 cents or 10 cents cash during the rush hours. Mr. Witt said that the large two-man cars could be operated as one-man cars, and that he was opposed to jitneys because the burden of taxes was placed on the railway.

Charles H. Clark and Lawrence P. Crecelius, Cleveland, undertook the construction of a theoretical trolley line, competing with the Trenton Company. They said that such a line could be built more economically than the Trenton line. Mr. Crecelius said the company was losing money in supplying power for the cars from the Trenton power house on Lincoln Avenue. He suggested three substations for the distribution of power purchased from some other company. Mr. Clark said that the company's power plant was about 75 per cent efficient.

Victor B. Phillips, Cleveland, was a witness at the hearing on May 10.

Use of One-Man Cars Upheld

The bill introduced in the Massachusetts Legislature to prohibit the operation of one-man cars has been "given leave to withdraw." This bill was fostered by the street cartmen's unions and was strongly backed by the American Federation of Labor. At numerous public hearings every conceivable argument was brought up in support of this proposed legislation against the principle of one-man car operation. The strongest line of attack was on the ground of alleged danger to the public.

While refuting these charges of danger to the public, the railways made the weight of their case on the legitimate economy of the principle of one-man operation, and demonstrated conclusively to the legislators that had it not been for one-man cars many more miles of railway track would have been added to the already large abandonments in that state. Several managers showed that the passage of any anti-one-man car bill would result in the immediate suspension of service on many lines.

The failure of the labor interests to convince the Legislature of the existence of any alleged danger to the public is especially significant, because in Massachusetts hundreds of former two-man cars, double as well as single-truck, have been converted to one-man operation without any of the usual standard manufactured safety devices. The Massachusetts Department of Public Utilities requires only that some well-constructed device be installed accessible to passengers which will permit anyone inside the car to apply the brakes and unlock the doors in an emergency.

Be Wise and Advertise!

The Mitten management is "talking to the public" through the medium of advertisements in the Philadelphia *Public Ledger*. Emphasizing the fact that it deservedly has the support and confidence of the 10,000 employees of the Philadelphia Rapid Transit, it desires similar co-operation on the part of the public.

One of these advertisements says that fifty-two separate companies were originally started to operate street cars in Philadelphia, and each one was authorized to collect a separate fare. The roads were all gradually brought together in order to make possible one big operating company which would carry a passenger throughout the city for a single fare. Under these conditions the company is anxious to co-operate with the people to the end of supplying a car service of which they will have every reason to be proud and which will meet the ever-expanding need of the city.

"President Mitten's new departure in inaugurating a series of talks to the public on the problems, purposes, and hopes of the Philadelphia Rapid Transit Company is an excellent one," says the *Public Ledger* editorially, "and there is nothing more surely calculated to inspire confidence and insure co-operation than a frank understanding between the public utility and the public served by it. If, therefore, Mr. Mitten shall persevere in his announced intention to tell the plain facts about transit matters, he will perform a service to the corporation he serves so well."

Mitten Management Talks to the Public

Investment and Return of P. R. T. and Underlying Companies

	Capital Paid In	Mortgages Bonds, Etc.	Total Paid In	Rentals and Dividends	Interest Etc.	Total Return	Percent Per Annum
As at June 30, 1903......	$58,611,380	$ 9,373,569	$ 67,984,949	$6,429,446	$ 670,018	$ 7,099,464	10.44
" " " 1904......	64,596,060	9,315,444	73,911,504	6,429,321	671,412	7,100,733	9.61
" " " 1905......	67,583,700	10,394,278	77,977,978	6,729,341	713,634	7,442,975	9.54
" " " 1906......	68,461,440	20,416,611	88,878,051	6,729,438	1,106,584	7,836,022	8.82
" " " 1907......	77,343,520	21,260,794	98,604,314	7,039,026	1,142,123	8,181,149	8.30
" " " 1908......	81,909,532	21,207,372	103,116,904	7,047,651	1,141,556	8,189,207	7.94
" " " 1909......	86,436,055	24,875,039	111,311,094	7,347,661	1,214,203	8,561,864	7.69
" " " 1910......	86,436,055	26,019,039	112,455,094	7,356,786	1,337,468	8,694,254	7.73
" " " 1911......	86,438,500	27,659,019	114,097,519	7,358,342	1,429,026	8,787,368	7.70
" " " 1912......	86,438,500	29,432,019	115,870,519	7,365,980	1,460,387	8,826,367	7.62
" " " 1913......	86,440,255	33,945,317	120,385,572	7,364,939	1,640,345	9,005,284	7.48
" " " 1914......	86,440,255	39,167,817	125,608,072	7,364,635	2,008,192	9,372,827	7.46
" " " 1915......	86,440,255	41,052,811	127,493,066	7,364,997	2,089,759	9,454,756	7.42
" " " 1916......	86,440,255	40,594,811	127,035,066	7,964,443	2,139,062	10,103,505	7.95
" " " 1917......	86,452,965	39,760,811	126,213,776	8,864,670	2,108,346	10,973,016	8.69
" " " 1918......	86,453,040	39,142,811	125,595,851	8,865,181	2,097,999	10,963,180	8.73
" " Dec. 31, 1919......	86,453,040	42,653,867	129,106,907	8,863,206	2,251,736	11,114,942	8.61
" " " **1920**......	86,453,040	42,841,819	**129,294,859**	7,366,490	2,336,620	9,703,110	**7.50**

$30,000,000 of this money, paid in by P.R.T., made possible the building of the Market Street "L," which the Philadelphia Real Estate Board says has more than doubled values of adjacent real estate in West Philadelphia. The real estate owners, by increased values, and the City of Philadelphia, by increased taxes, have benefited from the building of the Market Street "L" much more than the P.R.T. stockholder.

The increase in city assessments proves that $129,294,859, if invested in city real estate during this period, would have brought much greater returns to the investor. What inducement can be offered the investing public to secure from them the new money now required for further transit development?

No. 3

PHILADELPHIA RAPID TRANSIT COMPANY
T. E. Mitten, President.

PHILADELPHIANS ARE INFORMED OF MITTEN MANAGEMENT BY THIS TYPE OF AD

Only 3 per Cent of Boston Traffic Pays Five-Cent Fare

Edward Dana, general manager of the Boston (Mass). Elevated Railway, testifying before the New Jersey Board of Public Utilities, in the fare case of the Public Service Railway, outlined the policies of the Boston trustees and the results of their experiments with reduced fares.

Local riding has increased approximately 78 per cent on the Malden and Everett lines of the company, where a 5-cent fare for short hauls has recently been instituted. This is an experimental service instituted by the trustees for the purpose of endeavoring to regain the short-haul traffic lost since 1917 by the various increases in fares from the original 5-cent rate to the present 10-cent fare.

The decrease in total revenue passengers since 1917 has been 40,000,000, or about 12 per cent, according to Mr. Dana's testimony. The theory of the management, he explained, is that this loss took place not in the regular daily tidal traffic from the suburbs to the business center, but rather in the local rides in outlying communities; also possibly to some extent people living within the mile and a half zone from the center have been walking since the advent of higher fares. It is with the desire to regain some of this short-haul traffic without infringing on the revenue received from the regular 10-cent fare traffic that the trustees are trying out various 5-cent fare lines.

At present, he stated, 2.9 per cent of the total revenue passenger traffic of the system is being carried for a 5-cent fare, the balance all paying 10-cent fares. The 78 per cent increase in local riding in Malden and Everett is considered encouraging, but it must be further increased to 100 per cent to equal the revenue received from the local 10-cent fares before the 5-cent fare went into effect. Mr. Dana also said that the failure of the town authorities of Malden to aid in removing a competing jitney line may cause the abandonment of the experiment in that locality. They have also found, he said, that the three short 5-cent lines operating into the business district of Boston are doing a large business, with car mile earnings above the average for the system, but they have also taken traffic from the 10-cent lines.

Jersey Argument Closed

The appeal of the Public Service Railway, Newark, N. J., for a 10-cent fare is now formally before the Board of Public Utility Commissioners of that State. Concluding argument by counsel was made at Newark on May 5.

George L. Record, special counsel for Jersey City in charge of the case for the municipalities, charged the company with operating inefficiently. This was the basis of his whole argument.

Edmund W. Wakelee, counsel for the company, said that the 10-cent fare was the only rate that could afford adequate relief. It was difficult, according to him, to argue a case where there was so little to argue about. He said in conclusion:

> The statements and estimates of the company are not in dispute. The controlling principles of law are fixed and certain. That relief is necessary is incontrovertible, and the 10-cent rate is the only rate that can afford adequate relief. The company, therefore, confidently appeals to this board to dispose of this pending application in such a manner as to meet this critical situation and to effect substantial justice so far as it is possible to do so.

New Orleans Hearing Delayed

After a conference between State Attorney-General A. V. Coco and H. Generes Dufour, representing the New Orleans Railway, a motion was made by the Attorney-General for a continuance on the hearing of the application of the New Orleans Railway & Light Company for an injunction restraining the state from beginning legal proceedings against enforcement of the 8-cent fare. Judge Foster, of the Federal District Court, granted the continuance asked for till May 16, but upheld the temporary restraining order.

Announcement is made that the city of New Orleans will delay its answer to the injunction proceedings instituted against it by the receiver of the New Orleans Railway & Light Company until after the adjournment of the Constitutional convention. It will be recalled that there is now pending in the Federal Court an order restraining the city from interfering with the receiver in the collection of an 8-cent fare.

In the order of Judge Clayton, who issued a temporary injunction upon the request of the receiver, the city had twenty days from April 21 within which to file an answer.

City Attorney Kittredge is a delegate to the Constitutional Convention now in session and postponement was asked for by him after a conference had with H. Generes Dufour, counsel for the receiver. This action will, of course, delay the hearing thirty days.

Transportation News Notes

Interurban Fare Rise. — Passenger fare rates on the Fort Wayne, Van West & Lima Traction Company, operating between Lima, Ohio, and Fort Wayne, Ind., will be increased 10 per cent beginning June 1.

Beeler Rerouting in Effect.—Rerouting under the Beeler plan was begun on the system of the Kansas City (Mo.) Railways on May 1. The ordinance providing for the readjustment had been passed by the City Council, and was approved by the Public Service Commission, with little controversy or opposition. In the first few days of operation of the lines on which rerouting was begun there was no complaint, and there was the expected improvement in efficiency and economy. Rerouting will probably cover a period of several months.

Coach Company Says "Thank You."—The Fifth Avenue Coach Company, New York, N. Y., recently published its "Thank You" to the public in appreciation for various letters of commendation received from its patrons. The letters, some of which are reprinted in this pamphlet, relate a real experience with a courteous conductor or with a skillful driver. A practical example of recognition for accommodating service on the part of its employees is shown in the company's recent announcement of an increase in pay which the men will hereafter receive.

Wants Two-Cent Transfer Charge.—The increase in fare to 6 cents, with twenty tickets for a dollar and a 1-cent transfer charge, is not helping the financial condition of the Indianapolis Street Railway, its officials say, and when the thirty-day probation period has been completed on May 18 and the company again appears before the Indiana Public Service Commission it will ask for an additional 1-cent transfer charge. The general industrial depression, with its consequent unemployment, has decreased the number of passengers riding the cars daily to such an extent that the increase in rates is not holding the company even. Last year an average daily haulage was about 300,000 passengers. This year there are many days when less than 250,000 are riding. The company will ask authority to charge 6 cents, with twenty tickets for a dollar and 2 cents for a transfer.

Jitneys Use Metal Tickets.—The Milwaukee Bonded Carriers' Association, an organization of jitney men operating in Milwaukee, Wis., has recently commenced selling aluminum fare checks at the rate of seven for 50 cents. Checks purchased from any of the operators will be good for one ride on any jitney run by a member of the association. The new rate will be a reduction of 1 cent from the old jitney cash rate of 8 cents. The new cash rate will, however, be 10 cents. The railway rate is 7 cents cash, or eight tickets for 50 cents. Jitney operation in Milwaukee is regulated by state law and is under the supervision of the Wisconsin Railroad Commission. Permission must be obtained from the commission before a jitney can be operated in Milwaukee, and even after such permission has been obtained the commission continues to supervise the operation and sees that the routes assigned to an operator are adhered to and that he follows its regulations in other ways.

A Practical Application of Selling Transportation.—The Georgia Railway & Power Company, Atlanta, Ga., has capitalized some of the ideas expressed by President Arkwright in his recent address, "Don't Hate Your Customers," which was printed in the ELECTRIC RAILWAY JOURNAL for April 23, 1921. Two cardholders are to be installed in each car reading: "This car in charge of Conductor —— and Motorman ——." Each trainman will be furnished a slide bearing his name, which is to be inserted in the holder while he is on duty so that his customers may become familiar with his name and address him by it. The company is also endeavoring to teach the men the advantages of doing business in a way that tends to introduce a little personality and urges the men to greet their customers with a good morning or good evening as the case may be when they board their car. While the company does not make this the subject of a general order it is suggested to improve the standard of work.

Sustains Seven-Cent Fare. — The Pennsylvania Public Service Commission has refused the application of the Pennsylvania-Ohio Electric Company for permission to charge a 10-cent fare in New Castle, and has ordered a continuation of the 7-cent cash fare with six tickets for 40 cents and twenty tickets for a dollar with free transfers. The Sharon & New Castle Street Railway, which operates the local railway in New Castle, recently filed a new tariff of rates with the commission. The commission believes in a community like New Castle where there are many "short-haul" riders it would be a mistake to put a straight 10-cent cash fare into effect. The commission says in the event of an advance in the cash fare the short riders would be the ones to refrain from using the cars, and the company, in order to obtain the maximum amount of revenue and render the public service it is under obligation to perform, should make every effort to retain its short riders. It is also said "the policy of seeking to obtain a given amount of revenue by the rendition of service to a reduced number of patrons at a higher rate is not in harmony with proper utility service regulation and is also inimical to the accommodation and convenience of the public."

Personal Mention

Promotion for R. H. Wyatt

Old-Time Operator Becomes Superintendent of Louisville & Interurban Railroad

Richard H. Wyatt, general freight and passenger agent of the Louisville & Interurban Railroad, Louisville, Ky., since 1910, has been promoted to the newly created position of general superintendent of the interurban system, which is a subsidiary of the Louisville Railway. Mr. Wyatt and Samuel Riddle, now vice-president and superintendent of transportation of the Louisville Railway have been handling jointly the work that is now handled by Mr. Wyatt as general superintendent. The change, which was effective on April 30, marks the close of his thirty-eight years of active service with the Louisville Railway. His recent advancement is one of many promotions he has won in the service of the railway and interurban company.

R. H. WYATT

Mr. Wyatt, who is one of the veterans of the local street railway and interurban service, was originally employed by the late H. H. Littell, who organized the Louisville Railway. The new superintendent has in his possession a much-prized letter, probably the last that Mr. Littell ever wrote. It is in Mr. Littell's own handwriting and is in the nature of a compliment over the promotion which has just come to Mr. Wyatt.

One of Mr. Wyatt's first hard nuts to crack as the new general superintendent was in connection with the adoption of daylight saving by Louisville, commuters favoring a schedule based on daylight saving, while farmers and shippers wanted standard time. A compromise was reached by rearranging the schedule so that now both the time and the service are satisfactory to all.

Mr. Wyatt's connection with the Louisville transportation system dates back to 1883. His first work was handling the reins of a mule team pulling a car on the Twelfth Street line. Subsequently he became a conductor with the advent of electric cars, and later served as railway inspector. He then became transfer agent and afterwards drew an office assignment. For a number of years he was superintendent of the Highland carhouse and has also served as assistant paymaster.

When the interurban group of the Louisville Railway was formed in 1903, Mr. Wyatt became general express agent on the interurban lines. He has been general freight and passenger agent for the seven lines of the interurban system since the Shelbyville and LaGrange divisions were taken over by the Louisville & Interurban Railway in 1910.

E. I. Lewis and J. D. Campbell Picked for I. C. C.

Nominations of E. I. Lewis of Indianapolis, Ind., and James D. Campbell of Spokane, Wash., to the Interstate Commerce Commission, were confirmed without opposition by the Senate on May 3. The nominations were sent to the Senate by President Harding on April 28.

Mr. Campbell, an attorney, has practiced extensively before the Commission in the Intermountain rate cases. Mr. Lewis has for the past four years been chairman of the Indiana Public Utilities Commission. The selection by President Harding of Mr. Lewis was fully expected, but that of Mr. Campbell came as a surprise.

Mr. McCardle Commission Head

John W. McCardle, Indianapolis. Ind., was elected chairman of the Indiana Public Service Commission on May 2. Mr. McCardle was the unanimous selection of the members of the commission. He was nominated for the chairmanship by E. I. Lewis, retiring chairman, who has resigned from the commission to accept a place on the Interstate Commerce Commission. Mr. McCardle has been a member of the commission for four years and was recently reappointed by Governor McCray for a second term. He has been vice-chairman of the commission and is regarded as one of the ablest men who have been connected with the Indiana utilities body. With the reorganization of the commission Lawrence C. Loughry, Monticello, Ind., has taken office as secretary. He succeeds Frank P. Litschert, former secretary of the Governor, who has held the position temporarily following the resignation of Carl H. Mote. He is a graduate of the Indiana University Law School. Carl Wilde succeeded M. D. Atwater as director of service.

Ralph Stickle Resigns

Well-Known Claims Man of Cleveland Railway to Establish Private Law Practice

Ralph Stickle, assistant superintendent of the accident department of the Cleveland (Ohio) Railway, has resigned to enter the private practice of law in Cleveland. His resignation is much regretted by the operators of the road because of the efficient work that he has done in reducing the accident hazard to a minimum.

Particular study has been made by Mr. Stickle of the automobile hazard, how it may be lessened by the railway companies, autoists and public. He presented a paper on this subject before the Claims Association last October in which he stated that it is the business of claims men to try to make transportation men, autoists and the public realize the importance of this problem and to solve it. Little can be done to relieve the claims department in handling auto accidents except to prevent accidents. In his agitation for safety he recommends the repeal of antiquated anti-trolley legislation and systematic continuous safety work among employees, besides propaganda directed toward the education of the public. Also a great step forward would be taken if we had uniform traffic laws in every state so that the different kinds of traffic could be segregated.

RALPH STICKLE

Mr. Stickle has been with the Cleveland Railway for seven years, having for some time been in charge of the current claim work. He has also been identified actively for several years with the Claims Association and the American Electric Railway Association.

Before taking up the practice of law, Mr. Stickle was a newspaper man. For five years he was the political correspondent at the state capitol at Columbus for the Cleveland *News* and later was departmental editor on Cleveland newspapers. He is a graduate of Western Reserve University and the Baldwin-Wallace Law School.

Mr. Stickle will be succeeded about May 15 by Joseph S. Kubu, who is now claim agent for the Utica lines of the New York Railways.

Mr. McAneny Selects Working Force of Transit Commission

Actual work on the plan to reorganize the transit system of New York city has been started by the appointment by George McAneny, chairman of the new Transit Commission, of Brigadier-General Lincoln C. Andrews as executive officer, Daniel L. Turner as consulting engineer, and three men who will have charge of the work of evaluating the property of the transit companies. The appraisal engineers named include John H. Madden of Brooklyn, valuation engineer; Frederick W. Lindars, chief accountant; and Major John C. Cooper, assistant chief accountant. Also Captain Edward T. Fitzgerald was named acting chief of the Transit Bureau. Five of the new appointees were connected with the old Public Service Commission before the war.

Brigadier-General Lincoln C. Andrews, who has been selected as executive officer of the Transit Commission recently retired from the army. He will have general charge of the new commission's working organization and will, so far as may be necessary, assign its employees to the several divisions or bureaus and superintend the performance of their duties. General Andrews is a graduate of the United States Military Academy. He saw active service in France in the World War and after the armistice became Assistant Provost Marshal General of the Expeditionary Forces.

Daniel L. Turner, who has been appointed consulting engineer to the commission, since 1916 has served as chief engineer under the Public Service Commission, and since 1919 under the Transit Construction Commission. As such he will be the commission's chief advisory engineering officer.

Mr. Madden, selected for engineering head of the valuation work, was assistant division engineer of the old commission and did valuable work in supervising the construction of the new subway in William Street, where many problems new to engineering practice were encountered and successfully solved.

Frederick W. Lindars, now chief accountant, has been a member of the firm of Banks, Haig & Lindars, expert accountants. He also served in a similar capacity with the commission from 1916 to 1919, and organized the Bureau of Accounting, established by the commission to check the expenditures of the Interborough Rapid Transit Company and the New York Municipal Railway Corporation under the new subway contract.

Major Cooper served with Mr. Lindars under the old commission. He resigned in 1915 to enter the military service. Since the war he has been engaged in private business.

Captain Fitzgerald was with the old commission for several years as railway engineer. He served in the navy throughout the war as captain, rejoining the engineering department of the commission at the close of the war. His present assignment will be temporary only, but after he has placed the bureau on a proper footing, he may be used by the commission for similar work in other bureaus.

The fixing of the valuation will be the first move in the program of readjustment and rehabilitation planned by the commission. The work will probably begin this week when the new officials take office.

Mr. McAloney in Atlanta

Well Known Equipment Man Takes Charge of Rolling Stock of Georgia Railways

W. H. McAloney has recently become superintendent of equipment of the Georgia Railway & Power Company, Atlanta, Ga. He will have full charge of shops, carhouses and garage, and will have jurisdiction over maintenance of all street cars and automobile equipment. The appointment of Mr. McAloney was made by General Manager Butler to fill the vacancy caused by the death of Mr. Moore in 1919.

W. H. McALONEY

Mr. McAloney is considered to be one of the leading equipment men in the country. He was for about sixteen years superintendent of rolling stock of the Denver (Col.) Tramway. While there he gained for himself a great many friends and much popularity because of his interest in appliances for the convenience and comfort of the employees. Articles by Mr. McAloney have appeared in the JOURNAL from time to time, dealing particularly with his experiences and suggestions regarding various pieces of railway equipment.

While in Denver he was actively connected with the welfare association of the Denver Tramways. Many times his wise words of admonition to employees were put in the form of maxims. One of these, which was made some years ago and is just as true today, is, "The traveling public is becoming more and more exacting, and the standard of service is continually being raised. Let us try to be faithful, accurate and constant within the limits of commercial error."

Mr. McAloney began work for the Denver Tramways as a conductor in 1891, and after a few months of this work entered the office of E. W. Olds, at that time master mechanic. Soon afterward he was appointed division superintendent of the East Division and later returned to the shops as storekeeper. In 1902 he became superintendent of rolling stock, the position he held at the time of his resignation in 1918.

In July, 1918, Mr. McAloney was appointed superintendent of rolling stock of the Winnipeg (Man.) Electric Railway. He remained in Winnipeg until 1920, when he became associated with John A. Beeler, consulting engineer.

Mr. McAloney's arrival in Atlanta makes the third Winnipeg man to join the operating staff of the Georgia Railways & Power Company. General Manager Butler not long ago directed the operation of the Winnipeg Electric Railway and J. R. Ong, whose appointment to the position as transportation engineer in Atlanta was made known in the April 9 issue of the JOURNAL, held the same title in Winnipeg.

Walter C. Strunk has resigned from the mechanical research and construction division of the Interborough Rapid Transit Company motive power department to enter the service of the Westinghouse Electric & Manufacturing Company, Chester, Pa. Mr. Strunk, after his graduation from Swarthmore College in 1909, immediately entered the Metropolitan Street Railway Company Training School. Two years later he entered the electrical department, and in 1912, when the New York Railways Company was organized, he became assistant engineer in the motive power department of the Interborough Rapid Transit Company and New York Railways Company. His work up to 1917 was in the Economics Division, since which time he has been in charge of all tests and experimental work in connection with mechanical power station equipment.

Edward C. Marshall, Charlotte, N. C., has been elected president of the Southern Public Utility Company by the directors to succeed the late Z. V. Taylor, who died suddenly about a month ago. Mr. Marshall has been treasurer of the company since its organization in 1913, and in that capacity had been the closest associate of Mr. Taylor in the direction and development of the company, his help having been especially valuable in working out the financial problems during the constant expansion and development of its properties. Prior to 1913 he was for a number of years connected in an official capacity with the Southern Power Company, of which the Southern Public Utilities Company is a subsidiary. The latter company operates the street railway, lighting and electric power systems in Charlotte, Winston-Salem, N. J.; Greenville, N. C., and Anderson, S. C., and the power and lighting systems in nearly a dozen other towns in the Carolinas. Its holdings represent an estimated value of about $20,000,000.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Another Coal Shortage Impending?

Production Is Still Low, Consumers' Stocks Are Decreasing, but More Interest Is Displayed

Despite present light demand for coal and the prevailing promptness of railroad deliveries considerable discussion continues to be heard regarding prospects of another coal shortage this fall and winter. According to the May 12 issue of *Coal Age*, C. H. Markham, president of the Illinois Central Railroad, is advertising in newspapers in the Middle West warning the public of an impending coal shortage because, "as one of the largest coal-carrying roads in the Middle West," he considers it a duty to sound this warning. He plainly states that the country is headed for a serious bituminous coal shortage. At the same time Senator Elkins, in a statement issued from Washington, emphatically declares that a "sudden restoration of the market and an attempt to crowd the hauling of the bulk of the nation's coal into the autumn and winter months will place upon the railroads a burden which they are admittedly unable to discharge adequately."

PRODUCTION HAS INCREASED LATELY

Production of soft coal during the last three weeks of April started an upward climb from the low point of about 6,000,000 tons per week to nearly 7,000,000 tons. This increase in production followed a steady decline in output that began last December, and it must be remembered that even the present rate of operation is still lower than at any time since April, 1914, except for the period of the coal strike in 1919.

Stocks of bituminous coal in the hands of consumers in this country as of April 1, 1921, are estimated at about 37,000,000 tons by the Geological Survey. This represents a decrease of about 8,000,000 tons in the stocks held by consumers on Jan. 1, 1921. As current consumption and exports are doubtless in excess of current production the draft on consumers' stocks still continues.

The contract market remains dormant as quotations are too far above spot coal prices to attract buyers. Producers hold to their prices firmly, however, and refuse to close business on a yearly basis unless granted a figure which assures them some profit. The spot market, on the whole, is perhaps a little more active. A "busy early" campaign to encourage stocking coal has stimulated business in the Middle West, and in New England buyers seem to be getting over their indifference too. There was a distinct revival to the export market the latter part of April. Throughout the country the decline of consumers' stocks is causing buyers to keep more actively in touch with the market even though they are not taking a heavier volume of coal.

Some purchasers are apparently holding off in the hope of a drop in freight rates. Even if this should materialize in time to care for a considerable tonnage before the expected fall rush may develop, however, it still seems hardly likely that there is prospect of a drop large enough to justify holding back purchases.

Better Sentiment Indicated by Business Conditions

Fewer Failures, Lower Discounts and Easier Money, Lower Prices and Wages, Less Unemployment

It seems apparent that a turn for the better and a change in business sentiment are indicated in some items of general business news. In April the failures showed a falling off for the first time in a great many months. Dun's, Bradstreet's and all of the large banks are now seeing hopeful signs in current business conditions. Federal Reserve Bank discounts are being lowered. This is occasioned by easier money and in turn has the effect of making money still easier, after which building prospects are brighter.

The number of idle freight cars is decreasing — although the decreased number is made up entirely of freight cars, nevertheless, if more coal is being moved, is it not indicative of a belief on the part of industry that greater production is soon due?

Almost all business commodities are now down to a level which, while not in all cases equal to the pre-war level, still is of sufficient lowness to warrant resumption of activities on a fair scale. Steel is down and steel wages with it. The only item that is seen to be up is the item of freight, and pressure is now being brought to bear on that. It would not be unreasonable to expect lower freight rates within sixty days.

Non-employment in April was about the same as in March. Some industries show great lack of employment, but many industries show that non-employment is lessening. The indications are that from now on the numbers of unemployed can be expected to decrease.

There seems to be one answer—that business is now on the beginning of the floodtide. He who waits until the tide is full to cultivate this business will probably find that he has lost the momentum of being carried along on the wave.

Stock Deliveries of Standard Size Gears and Pinions

Buying Is Light, Both for Repairs and New Cars, but Is Expected to Increase Gradually

Manufacturers of railway motor gears and pinions have for some time been completely caught up on orders and at the present time are carrying a considerable quantity of standard sizes in stock. Immediate shipments can therefore be made on these, but where special gear blanks have to be ordered for finishing, deliveries range as long as three weeks to four months. Present production in this field is about on an average of 50 per cent of capacity. Some manufacturers are operating a full force of workmen on half time, others have reduced their shop force and the number of working hours per week in about equal proportion.

Demand for gears and pinions this spring is quite uniformly reported to be much below normal. Customers are existing from hand to mouth and repair orders are placed only as is absolutely necessary. With the period of long deliveries well past there is of course little necessity now for a railway to stock gears and pinions. Orders on behalf of new cars are almost negligible for the reason that car builders are still well stocked with motors purchased last year and motor manufacturers are producing only at about one quarter of their capacity.

REDUCTIONS NOT UNIFORM

Prices in this field are trending downward in view of labor and material reductions. Wages have been cut as much as 15 per cent in some instances, while in others war-time prices still prevail. Consequently the price situation varies among different producers, one, for instance, reducing both gears and pinions about 5 per cent the first of last month, a drop of about 10 per cent from the peak, while another manufacturer has made about a 10 per cent decrease on pinions but has not reduced gear prices. The reason for this, it is stated, is that the cost of raw material on gears has not come down appreciably. With the reduction in steel prices and the cut in wages recently put into effect by the United States Steel Corporation, however, it would not be surprising to see a reflection of this upon gear and pinion quotations before long, especially where labor readjustments have not yet been made.

In general a gradual resumption of business is anticipated in this field the balance of the year, but a fairly brisk demand is not expected to materialize before the fall.

Some Activity in Fare Register Market

Some Decrease Recently in Normal Demand Felt Early This Year—Prices Are Unchanged and Shipments Are Prompt

Sales of fare registers during the first two months of this year, usually a slack period with manufacturers, are reported to have held up well to the standard of a year ago. Recently there has been some falling off in demand, it is true, but the market shapes up well in comparison with other classes of railway equipment when the long life and small cost of the fare register per car is taken into consideration.

Stocks of raw material are large, too much so in some instances. Manufacturers are not overstocked on the finished product but hold a sufficient supply to insure prompt shipments. With the falling off of business noted above, production has been cut down and now is such that a great many more registers could be turned out if necessary, especially where additions to plant have been made.

MATERIAL AND LABOR BOTH DOWN

Wages in this field have generally been reduced from 10 to 20 per cent and further cuts may be made, it is stated, at such time as conditions warrant. Material has come down in cost on an average of 20 to 25 per cent, too. In a representative instance, however, the average price of fare registers in 1920 stood about 75 per cent higher than in 1914, while costs went up approximately 110 per cent during the same period. Therefore though prices in this line have not been reduced, quotations on last year's basis are still lower in proportion to cost than in 1914. If material and labor come down further, however, producers will be in a position to reduce selling prices, it is stated. The cost of renting fare registers, where cars are equipped on that basis, shows no reduction either, since renting prices were maintained throughout the war period without change.

Regarding the general outlook for business in this field, producers are reducing expenditures to the lowest possible level on the expectation that a return to brisk business will not occur for some time to come. Revision of Federal tax laws and the release from wage agreements with railway employees are two things specifically mentioned as needing remedy before the situation will improve.

Small Electrification Projected in Brazil

According to advices from the American Consul at Rio de Janeiro, Brazil, part of the railroad at the Itabira de Matto Dentro iron mines will be electrified in conjunction with the project for electrical equipment of those mines, for which a hydro-electric plant will be installed on the Piracicaba River, in the State of Minas Geraes.

Rolling Stock

The City of New York, N. Y., through an appropriation of $56,000 granted on May 6, has authorized Grover A. Whalen, Commissioner of Plants and Structures, to purchase trackless trolley cars to be placed in operation on Staten Island within the next sixty days. Eight cars will be operated over two routes, one from Meier's Corner to Linoleumville, a distance of 2½ miles, and the other from Manor Road to Seaview Hospital, a distance of 4 miles.

The Monongahela Valley Traction Company, Fairmont, W. Va., has recently purchased a new 50-ton Class B Baldwin-Westinghouse locomotive, a duplicate of locomotive No. 2,000, installed about two years ago, to handle carload and package freight business. It is equipped with four type 562-D-5, 100 hp., 600-volt, field control motors and double-end HL control. It will be used for general utility haulage as this company does extensive business on a steam railroad basis of operation. The general characteristics of this locomotive are as follows:

Weight	50 tons
Maximum tractive effort (25 per cent adhesion)	25,000 lb.
Normal tractive effort at 9.7 m.p.h. (full field 1 hour)	15,200 lb.
Continuous tractive effort with forced ventilation (short field)	9,000 lb.
Maximum trailing load starting on ½ per cent grade	860 tons
Balancing speed (short field at 600 volts) on level with 500-ton trailing load	17.5 m.p.h.
Balancing speed (short field at 600 volts) on 3 per cent grade with 200-ton trailing load	10.5 m.p.h.

The United Railways and Electric Company of Baltimore, Md., mentioned in last week's issue as placing an order for ten safety cars, has issued the following information and specifications on these cars:

Number of cars ordered	Ten
Date of order	April 25, 1921
Delivery	Sixty working days
Builder	The J. G. Brill Company
Type of car	Safety; double door
Weight, total	17,000 lb.
Length	31 ft. 1 in.
Truck wheelbase	8 ft. 0 in.
Width	7 ft. 10⅝ in.
Height, rail to roof boards	9 ft. 10⅝ in.
Body	Steel
Interior trim	Cherry
Roof	Arch
Air brakes	Westinghouse
Bumpers	Three-inch channel
Car signal system	Faraday
Control	Safety Car Devices Company
Curtain fixtures	National Lock Washer
Curtain material	Pantasote
Designation signs	Hunter
Door operating mechanism	Safety Car Devices Company
Fare boxes	Johnson
Fenders or wheelguards	H. B. wheelguards
Gears and pinions	Nuttal, helical
Hand brakes	Peacock
Heater equipment	Consolidated Car Heating Company
Headlights	Dayton Mfg. Company
Journal boxes	Brill
Motors, type and number	Two Westinghouse 508, inside hung
Registers	International R7
Sanders	Ohio Brass Company
Sash fixtures	Brill
Seats	Brill
Seating material	Wood slats
Slack adjuster	Gould
Trolley catchers or retrievers	"Q P" catchers
Trolley base	U. S. No. 6
Trucks	Brill
Ventilators	Brill
Wheel (type and size)	26-in. rolled steel

Youngstown (Ohio) & Suburban Railway Company has recently placed in service a standard class B, 45 ton, Baldwin-Westinghouse locomotive. It is equipped with four type 562-D 5, 600-volt, 100-hp., field-control motors and HLF control. The new locomotive is required to handle the increase in the company's car load freight business.

Franchises

Linnton, Ore.—The City Council of Portland has assured residents of Linnton, a suburb of Portland long without car service, that a franchise will be granted for a railway to that district if the promoters of the proposed line give the city assurance that they will carry the project to completion. An application for a franchise for a line from Linnton to Portland was filed with the Council by J. B. Shaefer and others and was referred to City Attorney Grant with instructions that a franchise with clauses safeguarding the public be prepared and brought before the City Council. Before a franchise can be granted it must be advertised for a period of 60 days. The promoters of the proposed line have obtained a franchise from the County Board of Commissioners for the construction of the line from Linnton to Oilton, a distance of three miles. It is proposed to operate over the lines of the United Railway from Oilton to Twelfth and Burnside Streets, under a common-user clause. The city is asked to grant the franchise from the city limits to Twelfth and Burnside.

Track and Roadway

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has applied to the city for permission to double-track their line on Park Boulevard, a distance of one-half mile.

Toronto, Can.—No contracts for track reconstruction in Toronto will be let until after the commission takes over the railway system in September next. The commission has decided not to change the existing gage which is 4 ft. 11 in., against the standard 4 ft. 8½ in. of the radials, owing to the tremendous expense this change would incur.

British Columbia Electric Railway, Vancouver, Can.—The British Columbia Electric Railway has started work on the relaying of tracks on Government Street, Victoria.

Los Angeles (Cal.) Railway.—The Los Angeles Railway has started improving Maple Avenue. The track wlil be reconstructed with new 116-lb. girder rails between Washington and Thirty-second Streets and on Thirty-second Street between Santa Barbara and Wall.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway is planning track repair work on Millbury Street and on

South Main Street. According to the general manager there are other improvements which the company would like to undertake and which would cost about $300,000, but unless receipts warrant it these improvements will have to be deferred.

Morris County Traction Company, Morristown, N. J.—The Morris County Traction Company will relay the tracks in Wharton. The Morris County Freeholders will help relay the tracks and pave the street and charge the costs to the traction company, collecting it at the rate of $10,000 a year. The work will cost about $40,000.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is expected that the Dayton & Troy Electric Railway will lay heavier rails through Troy, Ohio, in which event the entire track will be torn up and the right of way repaved with brick.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company is planning to start extensive work on repairs of its tracks on First Street. Approximately $36,000 will be spent on First Street, including the reconstruction of considerable trackage.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company is planning extensive improvements on its interurban lines during the current year. The items include contract for the replacing of more than 50,000 ties, repairing of pavement in Oregon City, new station facilities on the Oregon City line at Oak Grove, maintenance work on bridges and trestle. It has been announced that the outlay will be about $200,000.

Pittsburgh (Pa.) Railways. — The Public Service Commission of Pennsylvania has abolished four grade crossings on the Pittsburgh & Charleroi Street Railway operated by the Pittsburgh Railways.

Saskatoon (Sask.) Municipal Railway.—Tenders addressed to the city commissioners, Saskatoon, were received until May 2, 1921, for approximately 5,000 ties for the Saskatoon Municipal Railway.

Houston, Bay Shore & Texas City Interurban Railway, Houston, Tex.—Construction work on the Houston, Bay Shore & Texas City Interurban line began about April 25, according to an announcement by E. Kennedy of Houston, Texas, president of the line. The first unit of the line to be built, Mr. Kennedy said, would be the section beginning at Main Street, Houston, and extending to the San Jacinto Battleground, a distance of 18 miles down the Buffalo River. It is estimated that this section can be built at a cost of $25,000 a mile, although Mr. Kennedy said some bids received were as low as $23,000 a mile. This railway was organized several months ago.

Utah-Idaho Central Railroad, Ogden, Utah.—Although proposed extensions of the Utah-Idaho Central Railroad from Preston, Idaho to Grace, Idaho, and possibly to Bancroft, have been urged by citizens of those cities, plans for the extension will not be considered until possibly next year, according to officials of the company. However, it is expected that steps to improve the road and to extend the lines to Grace and Bancroft, and possibly to Pocatello, will be taken in another year.

Trade Notes

Automatic Ventilator Company, New York City, manufacturer of car ventilators, has removed its offices to 25 West Broadway.

C. H. Wheeler Manufacturing Company, manufacturer of condensers, pumps, water cooling apparatus, etc., announces the removal of its New York City office to 50 Church Street.

Electrocar Corporation, 501 Fifth Avenue, New York City is the new name of the Berg Electric Car Company, which plans to manufacture buses for use in conjunction with electric railway systems.

The Electric Motor Repair Company, 627 Myrick Building, Springfield, Mass., has established a separate brush department in its organization and will henceforth market its carbon brushes under the trade name "Mohawk carbon brushes."

The Ross Heater & Mfg. Company, Inc., Buffalo, N. Y., announces the opening of a branch office in the New York City district, at 2 Rector Street, its sales agency being discontinued. C. M. Hardin, formerly located at the home office, will be in charge.

Gold Car Heating & Lighting Company, announces the removal of its offices and warehouse on May 1 to Bush Terminal, 220 Thirty-Sixth Street, Brooklyn, N Y. The company will now have much larger quarters and greater facilities for handling large orders.

Signal Transformers for Melbourne.—The Victorian Railway Commissioners, Spencer Street, Melbourne, Australia, will receive tenders until June 15 for fifty oil-immersed, single-phase track and signal transformers for power signalling (contract No. 33,901).

The Michigan Stamping Company, having absorbed the Toledo Metal Products Company, has moved from Toledo to Detroit, where it will be located at Mack Avenue and Terminal Railroad. Greatly increased manufacturing space will be afforded for production of the company's line of stamped steel outlet boxes.

The Power Specialty Company, New York City, manufacturer of superheaters, economizers and oil stills, has opened new offices in Kansas City, Mo., 512 Reliance Building and in Dallas, Tex., 627 Linz Building. The Kansas City office is in charge of William F. Meyer, who for the last two years has been attached to the Chicago sales office. The Dallas office is in charge of M. W. Brown.

The Peerless Equipment Company, Hanover, Pa., has purchased the entire business of the Electrical Manufacturers' Equipment Company, Chicago. This includes the manufacturing and selling of "Segur" coil-winding tools and allied equipment. This line will be combined with the line of "Peerless" armature repair tools, which business has recently been purchased by the Peerless company from the Manley Manufacturing Company, York, Pa. The Electric Service Supplies Company will continue to act as exclusive selling agents for the Peerless Equipment Company.

New Advertising Literature

Cranes.—The Universal Crane Company, Cleveland, is distributing bulletin No. 11, describing the Universal cranes.

Transformers. — Bulletin 2005 describes "Pittsburgh Power Transformers" of the Pittsburgh Transformer Company, Pittsburgh.

Oil Engines.—The Anderson Foundry & Machine Company, Anderson, Ind., is distributing a folder describing its type "K" Anderson oil engines.

Insulators.—The Hopewell Insulation & Manufacturing Company, Hopewell, Va., has recently published catalog No. 1, covering its types of insulators.

Evaporators. — The Griscom-Russell Company, 90 West Street, New York City, is distributing bulletin No. 330, the Reilly self-scaling evaporator.

Coin Counters.—The C. J. Root Company, Bristol, Conn., has compiled a book, "The Census Takers of Industry," descriptive of coin-counting operations.

Electric Hoists.—The Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth Street, New York City, have issued bulletin No. 48,967.

Lubrication.—"Turbine Lubrication," Part 2, is the subject of the leading article in the April, 1921, issue of *Lubrication* published by the Texas Company, 17 Battery Place, New York City.

Turbo-Generator Sets.—"Turbo-Generator Sets" is the title of bulletin No. 28 recently issued by the Ridgway Dynamo & Engine Company, Ridgway, Pa., in which it describes the latest improvements, including its pneumatic governor.

Oil-Heating Apparatus.—The Power Specialty Company, New York City, has published a forty-page bulletin on the results of investigations on the requirements of oil-heating apparatus with a view to developing a more efficient type of still.

Stokers.—The Combustion Engineering Corporation, 43 Broad Street, New York, has issued bulletin C-2, describing the Coxe stoker. The company is also distributing two pamphlets, one entitled "Use of Pulverized Coal Under Central Station Boilers" and the other "Powdered Coal Application to Four 2640-Hp. Boilers."

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, May 21, 1921 *Number* 21

A Number of Celebrations Were Held on May 4

THE prominence that was given to National Electric Railway Day by the newspapers generally throughout the country on May 4 and 5 indicates the importance in which the industry is held by those who deal in publicity. The committee on publicity is to be congratulated on the success of its national advertising. It was a notable achievement in so short a space of time to enlist the support of so many companies and to have them successfully stage demonstrations of one sort or another. That this was possible shows a realization on the part of the industry that up-to-date merchandising methods bring results. Few believed that National Electric Railway Day could attract such widespread attention. But when virtually all the papers of the country carried either a national or a local story of the development of the electric traction industry the effort was well worth while. The effect on each property of thus recalling the history of the enterprise to the people's memory must be beneficial. It should result in a better general understanding of the railway's problems, help to change walkers to riders and conduce to a more sympathetic attitude on the part of the public toward the railway's affairs. Means which will bring about these results are worthy of encouragement.

Keep the Coal Moving from Mine to Power-House Bunker

THE National Coal Association is making a strenuous effort to stimulate prompt buying of coal, as the demand during the past four months has been "off" to an alarming extent. As the producing companies have practically no storage facilities this means that there is an accumulated deficiency in production, which will necessarily cause congestion later. The movement will remind electric railway men of the paper read at the Atlantic City convention last October by Eugene McAuliffe of the Union Colliery Company, St. Louis. He explained clearly the coal problem as it is viewed by the producer. He showed how the consumer exerts a powerful influence on the cost and adequacy of coal production, and advocated legislation which would provide for a seasonal variation in freight rates to induce flow at times of otherwise light demand. He showed, also, that the *bête noire* of the coal business is this light demand during the first few months of the year, which is illustrated to an extreme degree by conditions in 1921.

The Coal Association seeks to lay the burden for present conditions on the consumers, but the latter, at least as far as the electric railways are concerned, are justified, to a considerable extent, in "passing the buck" back again. A buyers' market has replaced the sellers' market which existed during and immediately after the war, putting the electric railways in a better position than they occupied formerly. They will undoubtedly, however, co-operate in a movement to cause uniformity in coal demand, but the producers must so adjust prices as to overcome the present obstacles as to the placing of orders. The railroads have an important part to play here also. Granted, however, that the electric railways are convinced that all is being done by the mines and railroads that can be done, then they are justified in storing the maximum possible quantities of coal, for they will profit in the end financially and otherwise when the mines operate with greater regularity.

Coal Demand Is Affected by Many Considerations

THERE is no doubt it is desirable to keep the coal mines operating and the coal moving. But what are the factors involved? In this connection three main questions arise: First, why is the demand so light this spring? Second, can electric railways buy more coal now than they require for current needs? Third, what economic forces can be modified to improve the situation as a whole?

As to the first question, undoubtedly the situation is a reaction from the condition of last year, when the supply which could be delivered was far less than the demand, and prices soared. Prices are lower now and the former car shortage has been replaced by a surplus, but the consumers do not buy. There are several factors in this which may be suggested by these possibilities: There may not have been a price drop considered to be commensurate with what is justified by conditions, even though prices are now lower than those set by the coal administration during the war; the actual conditions may not be fully understood; there may be lack of confidence in the stability of prices; the financial stringency may cause a willingness to "take a chance" as to higher prices and possible later shortage; there may be some apprehension as to ability to store much coal without serious loss and some question as to the economy of investing money for this purpose; there may not be any conviction that present lack of demand means later shortage.

As to the second question, the electric railways already do a great deal in the way of storing coal. Investigations made by the American Electric Railway Association indicate that on the average about six weeks' supply is carried. The coal requirements of the electric railways are rather uniform, but they naturally need a reserve to insure continuity of service and they desire to take advantage of any money saving which is within reach. Hence they have considered storage a desirable part of their power-plant program. Probably they can stretch their storage space a little if they can see their way clear to buy coal to fill it.

After all, the principal way in which the electric railways can help the producers is indirect rather than direct. Nationally the electric railways now "cut quite a figure," much more so than before the war. Thus they are in a position to help, more perhaps than formerly, any practicable scheme for improving the coal situation. They can keep the subject prominently before their constituency and can join as an industry with other great coal-consuming utilities and with coal producers and transporters in removing unnatural barriers to the production, carrying and utilization of that basic necessity, coal.

Conditions Are Better on Several Typical Properties

CORROBORATION of the cheerful outlook for the future reflected in the recent figures of earnings of the electric railways as made public by the American Electric Railway Association is to be found in the returns which are contained in the annual reports of the individual companies for the year ended Dec. 31. These reports are now being received for review and almost without exception they show that the corner was turned some time ago. This does not mean that trying times are over. Far from it. But the returns coming in do indicate most healthy growth in gross receipts, with expenses within bounds and the prospect bright for operation in the future at lower cost.

An example or two will suffice. All the roads examined show healthy growth in gross. In one or two instances, in fact, this growth has been phenomenal. Thus one strictly interurban road shows an improvement in gross over the previous year of about $1,000,000, while the net increased only $46,000. This seems disproportionate. It is. The cheering fact, however, is that the growth of the business has been substantial and may reasonably be expected to remain constant and even to go on increasing, while there is every prospect that expenses will be reduced through decreases in operating costs, with the result that the spread between gross receipts and expenses will widen.

On another property doing a combined city and interurban railway and lighting business the gross earnings have grown from $10,521,000 in 1913 to $21,350,000 in 1920. The increase in the receipts on the interurban lines in this period has been 99 per cent and on the city lines 52 per cent. The operating ratio, which in the case of this company is always quoted inclusive of taxes, has gone from 58.8 per cent to 72.7 per cent. Even so, a return to the average operating ratio of about 60 per cent would mean a difference to the benefit of the company of more than $2,000,000. Many there are who will be apt to say that it is too much to expect an early return to the old operating ratio, yet the prospects for this property most certainly appear bright.

On still another property a saving of more than $1,000,000 was brought about at one fell swoop by a recent reduction in wages. It may be that much of the money thus saved will find its way back into the property in the nature of improvements. Even if it does, the equity of all the security holders will be increased just that much and the financial credit of the company will be bettered accordingly. Sight must also not be lost of the fact that the prospect for the further easing of money rates in the near future should result in no inconsiderable saving in interest charges to companies, when refunding is carried out of borrowings negotiated at high interest rates during the wartime competition for loanable funds. Moreover, the better morale now everywhere apparent is an advantage very often incalculable in the form of dollars and cents, but not intangible in a case such as that at Kansas City, where 900 fewer employees are this year employed in operating the largest number of cars in the history of the company.

Reports of a group of syndicate properties widely scattered geographically confirm what has been said previously with respect to the outlook of the individual properties to which reference has been made. True, the recent depression in business has affected adversely to some extent the gross receipts of a number of companies, but with a revival in trade and lower cost for labor and supplies, all companies ought soon to be in a much more healthy condition. Here and there a manager still struggling fiercely with the problem of making both ends meet may be inclined to think we are chasing rainbows, but that will be only because he has been so deeply employed in trying to steer his own ship home safely through the fog that the ray of sunshine which is penetrating the mist in the distance has not yet been discernible to him.

Serviceable Use Found for Mr. Edison's Questions

AIDED and abetted by the Encyclopedia Britannica, the Book of Knowledge, Young's Astronomy, Bartlett's Familiar Quotations and Montgomery's American History anybody can answer the question, "Who was Marion?" and a lot of others propounded by Mr. Edison. It is an advantage, of course, to be well informed, and even the encyclopedic mind has its utility, but, as Spencer held, it may be said that education has a much higher function than developing in its recipient the ability glibly to answer questions about a lot of unrelated subjects. More particularly it is hard to see the value of questions such as Mr. Edison has propounded if applied in a test to determine the qualifications of an applicant for the position of a motorman or conductor or one seeking a job in the engineering, accounting or legal department of a railway.

Other doubting Thomases have also come forward. Among them is none other than Frank Hedley, president and general manager of the Interborough Rapid Transit. Mr. Hedley is peculiarly well fitted to judge. A graduate of the school of hard knocks, he knows the weaknesses of both the self-educated man and the college graduate, but he comes out strong, all other things being equal, for the man with collegiate training. It is Mr. Hedley's opinion, based on experience, that the man cannot be held down who does things a little better than some one else. Failure to answer questions such as Mr. Edison has set us as a standard will never daunt the ambition of men who are bent on being well informed on their chosen work or the work into which fortune, good or ill, has cast their lot. The views of Mr. Hedley on measures and men as expressed by him recently before the Cornell Society of Engineers are noted elsewhere in this issue.

While Mr. Edison's quotations may not be directly applicable to railway work, the compilation of his list offers this suggestion to the editors of publications circulating among the rank and file of the employees. Let them publish a dozen or so of such questions each month and answers the next, based on the little-remembered facts of history, civics, biology or chemistry, and even phases of railway work. Such a selection would renew the acquaintance of their readers with this knowledge and would be of much greater value than the general run of puzzle questions. Similar questions could also be propounded in circulars intended for distribution to the general public, and herein, it appears, lies the greatest utility of conundrums such as those propounded by the "Wizard of Menlo Park."

Remodeling Cars Is Marking Time

REPORTS are coming from all over the country of cars being remodeled and reconstructed for one-man operation. A considerable number of these cars before remodeling were considered obsolete or at least obsolescent. Many are open cars, and a large majority are double-truck cars. The reason for this increase in car remodeling is evident. The railways need additional equipment to maintain their service but have little money available for buying new equipment. The cost of such remodeling runs from $800 up to more than $3,000, depending on the extent to which changes are made. In most cases the operating companies are thus enabled to obtain from two to six remodeled cars for the same cost that one new safety car costs.

Generally the reason given for remodeling instead of purchasing new equipment is that of economy, plus necessity. Almost any company will admit that new equipment is more desirable than that built over, but it wants its equipment to keep pace with its growing traffic and claims that this is the only way in which this can be done. But if the question is one of economy, decision as to the policy to pursue can be determined only when all costs are considered, and negligence in this matter may mean that erroneous conclusions are reached.

The cost of old equipment does not end with the shop expenses during rehabilitation. The car body, besides being old and perhaps not well adapted to the new service, is pretty sure to be much heavier than modern equipment. The motor equipment, if old in style, is almost certain to be wasteful of energy, subject to a much higher maintenance expense and slow in acceleration. Finally, with the automatic devices, power-operated doors and step and other equipment for quick acceleration, retardation and passenger interchange, the modern cars make shorter stops and have a higher schedule speed—all of which means a great saving in expensive car-hours. Altogether, therefore, estimates on the economy which will result from the use of rebuilt equipment should include all of these points before definite conclusions can be drawn.

The remodeling which is being done should help to determine the size and capacity of cars that can be handled satisfactorily by one man in various classes of service. Many of the remodeled cars are much larger than the standard Birney car, and their use should demonstrate whether a larger type of car can be used in such service when operated by one man. The question of using a double-truck car instead of the single-truck type now used for one-man operation will also receive considerable attention. Broadly speaking, there is no doubt that the double-truck car has easier riding qualities than the single-truck type, as at present constructed, and is therefore more popular with the traveling public. Whether the economies resulting from the reduced weight of the single-truck car are more than sufficient to offset the advantages of the double-truck car is a question that this remodeling should help to solve. Viewed in its general aspect, the remodeling of cars is really a marking of time by the railways to tide them over this period of depression, yet this work should help to solve many points which are now open for discussion and eventually lead to a type of car which will be an advance in the art.

The Law of Compensation Remains Immutable

"PALPABLY erroneous and at best irrelevant" are the words with which the receivers of the Pittsburgh (Pa.) Railways dismissed the charges made against the company by George N. Munro, special solicitor for the city. Briefly these charges, as described in the last issue of this paper, were that the property was being rebuilt out of earnings at the expense of the car rider, whereas much of the work done was really a charge to capital. From the evidence at hand, railway men will be inclined to agree with the receivers. The facts are that the Pittsburgh Railways was long made the butt in political intrigue, with the result that the creditors eventually had to appeal for protection to the court. The managers of the road did the best they could before the receivers stepped in, but they were forced, in order to keep things going, to live out of capital. Through no fault of their own, except that of not being able earlier to convince the regulating authorities of the need for higher fares, the former managers had been compelled to see the utility of the property as a public service gradually dwindle. They were powerless to do the impossible. The court, however, said that the first duty of the receivers was to the public, and it is under the mandate of that body that the property is being rebuilt into fuller usefulness.

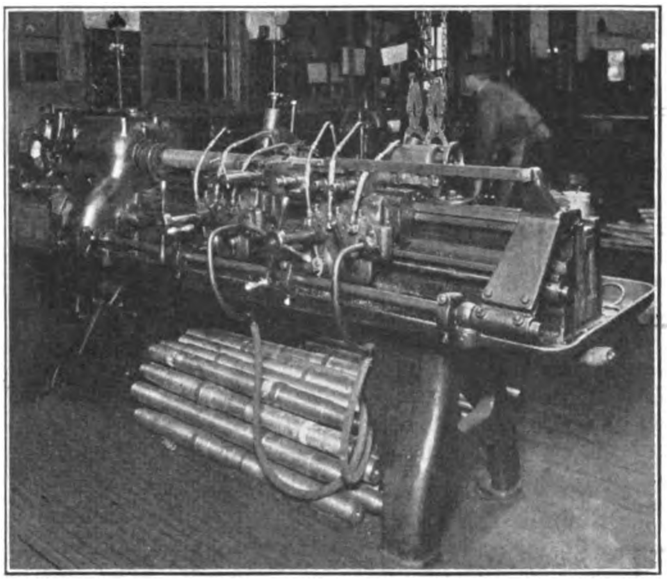
There is much to quarrel with in the report of Mr. Munro, but the principal objection to it is not so much what it says, but in the intimation that the riders of Pittsburgh are being milked by receivers who are interested only in rebuilding the property out of the earnings. This of course is not in accordance with the facts no matter which of the three sets of valuation figures is accepted as a criterion of the value of the road. Residents of Pittsburgh rode for months at less than cost to the company. They must expect now to make good for that orgy. The only other way is abandonment and dismantlement. The law of compensation still remains immutable.

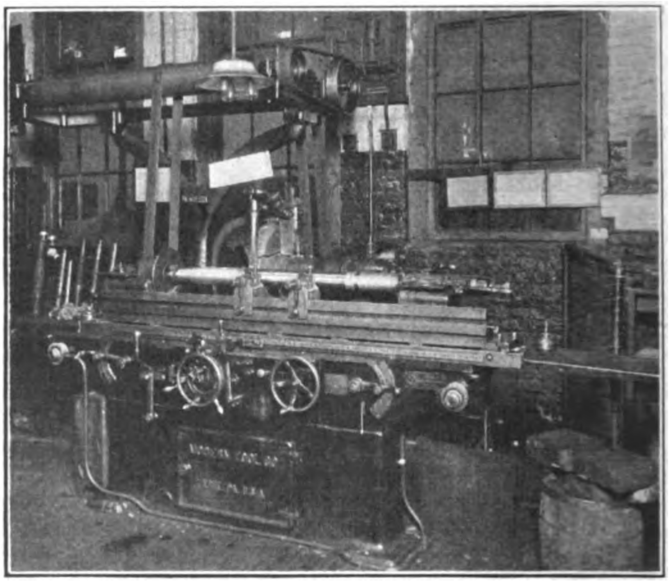
Quotation from the Federal Electric Railways Commission Report

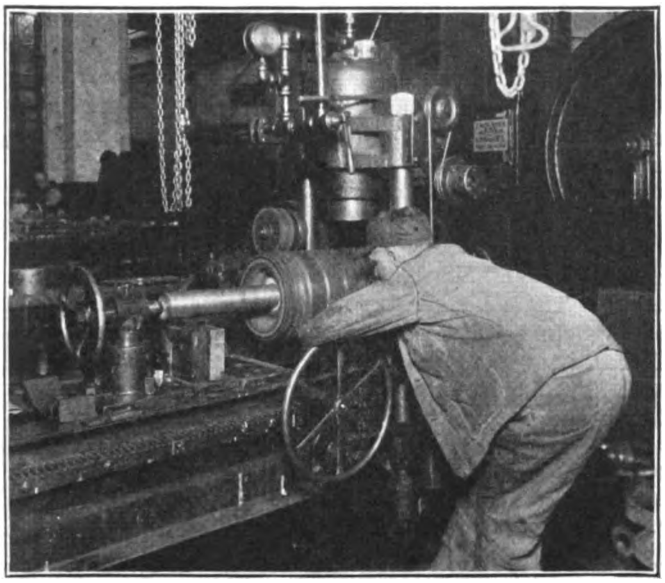
No. 21

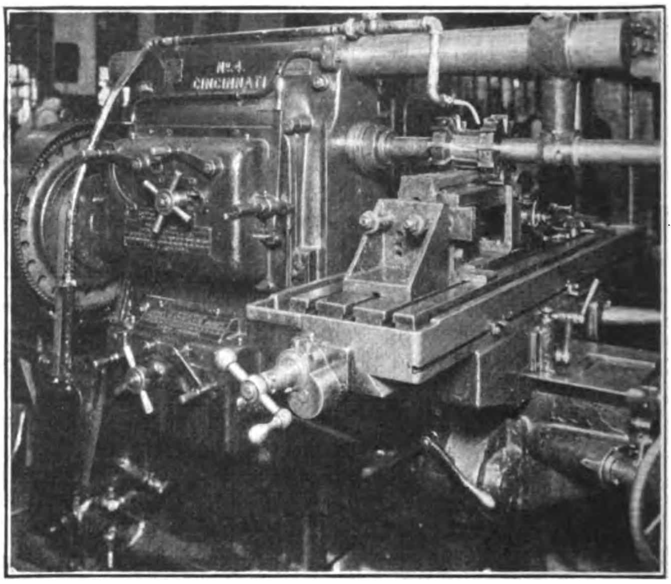
THAT street railway service and jitney service cannot permanently exist and pay their own way in competition with each other under any ordinary urban conditions seems to be well established by experience and by the conditions inherent in local transportation service, but the belief is general that the motor bus may properly be used to supplement the service rendered by the street cars. The motor bus may be used to render a sort of supplementary service, such as the service now rendered on Fifth Avenue and certain other high-grade residential streets in New York City by the Fifth Avenue Coach Company, or the buses may be operated on other independent routes merely as feeders to the street railway system to take care of traffic in partially developed territory in advance of the time when street railway tracks can be laid with reasonable assurance that the investment will be self-sustaining.

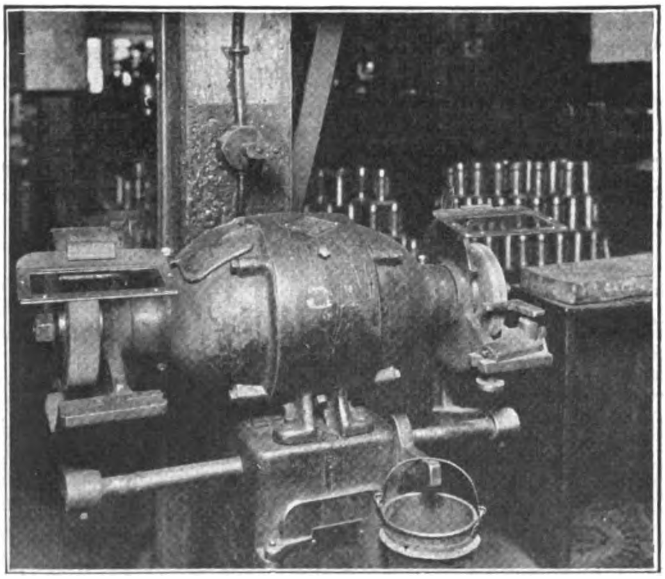
Chicago Surface Lines Tools Which Effect Economies in the Shops

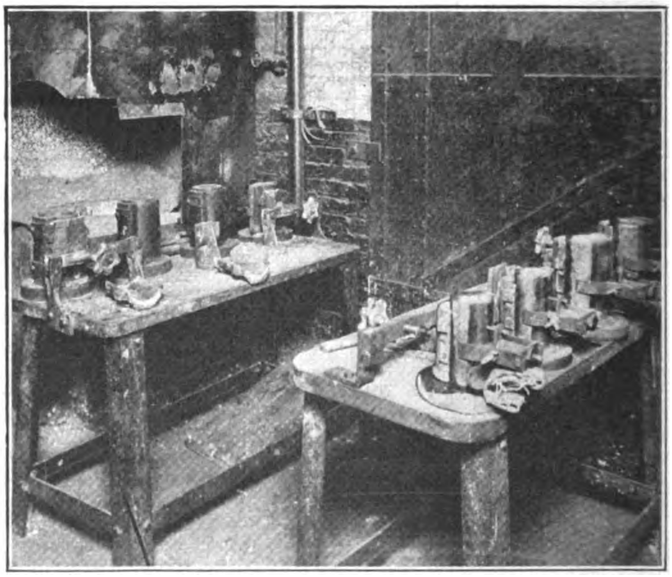












Top, left, six-operation "Lo-swing" lathe which speeds up armature shaft turning for Chicago Surface Lines.

Top, right, grinder used in finishing armature shafts, brass axle bearings and for miscellaneous work.

Middle, left, one-man shaft straightening machine. Friction driving pulley against armature while chalking eccentricity.

Middle, right, forming cutter and milling machine used in remachining built-up truck pedestal gibs.

Bottom, left, emery wheels fitted with glass protectors to make certain the protection of workmen's eyes.

Bottom, right, babbitting jig by which uniform dimensioned bearings are assured and which eliminates waiting for cooling.

A Few Chicago Shop Economies

Reducing the Cost of Machining Armature Shafts—Short Keyway Advantageous—Collett and Mandrel Facilitate Grinding of Brasses—One-Man Armature Shaft Straightener—Handy Babbitting Jig—New Air Tank Support

ALL replacement armature shafts for the Chicago Surface Lines are purchased in the rough blanks and machined and finished in the company's shops. This has been the practice for years, but the tools and machines employed were such that there was a good deal of difficulty in keeping up with the demand. Recently a special layout of machine tools was devised which now enables the shop not only readily to keep ahead of requirements but to turn and finish a shaft for a labor and overhead cost of approximately $4.75, as against an outside comparable cost of $15.

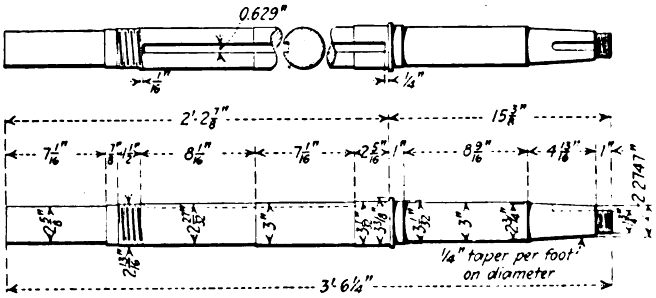
A group of seven machines is conveniently arranged for the progress of a shaft through the seven steps in its manufacture. It is first mounted in a centering machine and the ends drilled and countersunk for the lathe centers. A roughing lathe, adjacent, equipped with a high-speed cutting tool, turns off the rough surface and brings the shaft down in one pass to a size slightly larger than the biggest diameter. The shaft is then placed in a "Lo-Swing" lathe made by the Fitchburg (Mass.) Machine Company, in which the seven or more surfaces are turned. This machine, pictured herewith, is capable of performing six cutting operations simultaneously and each operation is equipped with an automatic feed and stop so that the length and depth of cut are automatically controlled. It is also equipped with a tapering device so that the taper for the pinion seat is made while the shaft is swung in this lathe, and this cut is likewise automatically controlled. The final cut on each surface of the shaft is made with a finishing tool.

The next step is to put the shaft in a grinder, shown herewith, where the various surfaces are brought down to the final diameter and a very smooth finish, an allowance of 0.012 to 0.015 in. being made for this finishing operation.

On the next and fifth step the shaft is swung in a lathe set up especially for threading the shaft. Next, the shaft is placed in a circular mill and the long center keyway for keying the armature core laminations and commutator is cut. For the seventh and last step the shaft is mounted in an end mill in order to cut the keyway for the pinion key. This is cut by first forcing the rotating end and side-cutting tool straight in radially, drilling a hole to the finished depth of the keyway and then side-cutting axially out toward the end of the shaft and coming out of the tapered surface just above the threaded end.

By means of these seven machines it is possible to complete nine shafts per eight-hour day and bring them to an accurate size and high finish. The grinding operation is the limiting step in the speed of production, so that in putting through shafts of a given type in lots of 100 the machinists on the six other steps are used on other work after completing their particular part of the machine work on the lot. By putting the shafts through in quantities of one type the time lost in setting up the machines for the different types is reduced to a very small item.

A new kink has been worked out in connection with the keyway for the pinion, which is designed to preserve the maximum strength of the shaft at the inner end of the taper where the maximum strain takes place. The keyway is machined only from a mid-point of the tapered surface to the end, leaving the full section of the shaft at the inner side of the pinion. It was felt that with a perfectly tapered and finished shaft and pinion, and with pinion properly pressed on, no key whatever is really needed. However, H. H. Adams, superintendent of shops and equipment, and T. A. Shaughnessy, master mechanic of the West Side shops, were not satisfied to depend altogether on friction, though they did conclude that a half-length key would give adequate insurance against loose pinions. A drawing of a shaft showing the dimensioning of the half-length keyway is reproduced herewith.



ARMATURE SHAFT FOR G. E. 226 MOTOR, SHOWING HALF-LENGTH KEYWAY FOR PINION

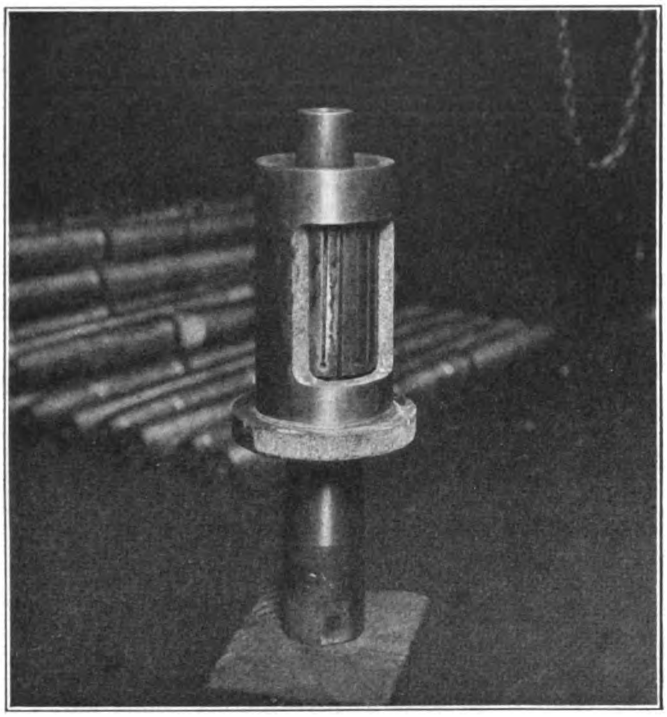
OPEN CIRCUITS TRACED TO CORE SLIPPAGE

Considerable trouble with open circuits due to breakage of the commutator leads on a type of motor having a very short core has been experienced in Chicago. The cause of this trouble was sought for a long time and various remedies were applied. The trouble continued, however, until occasion arose to renew several armature shafts. Then it was found that a very slight slippage of the armature core laminations on the shaft, amounting to something less than 1/16 in. at the periphery of the core, was taking place. Investigation developed this fault to be frequent, the existence of slippage being indicated or determined by sounding, by worn keys, by testing with a bar, rusty shafts, front core castings loose, etc. As any movement of the armature core on the shaft would be transmitted directly to the commutator leads and likely result in crystallization of the copper, this condition was hit upon as one cause of the unduly large number of opens. Hence, as these motors have been in service for a number of years, they are all being dismantled and rebuilt in a fundamental way as rapidly as they come in, so that there should result a material lowering of the maintenance cost in the future. In doing this work the old shaft is pressed out and the laminations bolted together, rebored for a shaft ⅛ in. larger in diameter and a new keyway cut in them.

Since this remedy has been applied the trouble has apparently been eliminated. The experience is pointed out here simply to suggest that this is a possible source of open circuit trouble, which, though uncommon, may explain a similar trouble on which other equipment men may have been seeking light.

GRINDING BRASS BEARINGS FACILITATED

The grinder above referred to is used between armature shaft jobs for grinding the exterior surface of the brass axle bearings. These are turned down to within 0.012 in. of size with a finishing tool and then ground to size. The set-up of the bearings for grinding has been made a very simple and quick operation by the use of an expanding collet. This is put inside the bearing and both are dropped over a mandrel, the large end of which is tapped solidly against a block of wood, locking the bearing firmly on the mandrel, which is then quickly placed between the grinder centers. The collet and bearing are easily removed by similarly champing the small end of the mandrel against the wood block. The collet and bearing assembled on the mandrel are shown in an accompanying picture. The collet may be seen through the hole in the bearing. The inside of these bearings is smoothed only with a finishing tool and a film of babbitt is run in to start the bearing off.

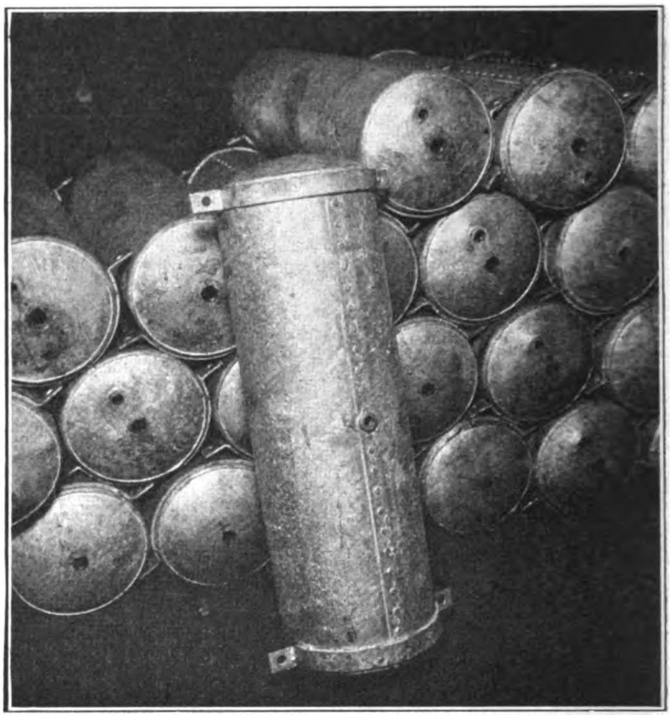


MANDREL COLLET AND BRASS BEARING ASSEMBLY USED FOR QUICK SET-UP OF BRASSES IN GRINDING MACHINE

It usually requires two men to do a satisfactory job of straightening an out-of-true armature shaft, for with the ordinary rig one man can hardly rotate the armature with one hand and at the same time gage and mark the high spots with the other. In the West Side Chicago shops, however, the straightener has been supplemented by a simple means of rotating the armature so that one man can easily do all of the work alone.

The flywheel shaft of the pump, which runs continuously and supplies the power to the hydraulic press forming a part of the straightener, was lengthened and a 6-in. pulley attached. This was belted to another pulley mounted on one end of a short countershaft at the end of a pivoted bracket. On the opposite end of this shaft is a leather-faced wood wheel, which, as the bracket is lowered, bears against the periphery of the armature, causing it to rotate. The position of this bracket is controlled by a foot pedal brought down underneath and in front of the machine.

The operator swings an armature requiring attention into the machine and then, resting his hand against the bed of machine, steps on the foot pedal, bringing the leather faced wheel down against the armature. As the latter rotates the eccentricity is gaged and chalked. When this is done pressure on the pedal is released and the bracket automatically pivots up out of the way. The armature is then properly set and pressure applied to spring the shaft.



A HALF BAND BRAZED ON THE AIR RESERVOIRS PROVIDES AN IMPROVED METHOD OF HANGING THEM

The Chicago surface companies have in use 2,000 Pullman trucks which are provided with no wearing plates on the pedestal gibs or jaws. When these surfaces become worn, therefore, they are reclaimed by welding, building up the worn surfaces and then machining back to size. This machining is expeditiously done by using a forming cutter which mills the three bearing surfaces, front face and two edges, to the final size and finish in one pass. An accompanying picture shows clearly the type of machine and cutter used and the L-shaped pedestal jaw as mounted in the milling machine.

GOGGLES THAT ARE ALWAYS USED

In a picture reproduced herewith it is seen how the need for goggles for workmen while using the emery wheels is dispensed with. It is difficult to secure proper use of goggles; the workmen do not always have them handy, and if they have them they often forget to use them. So 100 per cent safety in this respect is secured in the Chicago shops by attaching a rectangle of glass in a metal frame to the framework of the emery wheel in such a position that the workman automatically looks at his work from behind this glass shield. All the emery wheels are equipped in this manner.

A HANDY BABBITTING JIG

Some difficulty is experienced in obtaining babbitted bearings of uniform thickness on account of the variation in the shape of the shells. This has been overcome in Chicago through use of the scheme pictured on page 926. On two metal tables adjacent to the melting furnace are mounted four pairs of bearing cores for four sizes of bearings. At the sides of each of these iron cores are blocks against which the bearing shells rest as they are placed in position for pouring in the babbitt. These blocks are held in position by strap springs so that the shell may be brought closer to the core than the position obtaining as it comes in contact with the blocks, by forcing them against the spring supports.

The thickness of the bearing is thus kept uniform by measuring from the core to the outer edge of the shell and forcing the latter to the position giving the correct dimension. The shell is brought to and held in this position by a hand screw which bears against the back of the shell and is supported in a yoke at the front of the table. This yoke is hinged to the center of three iron posts and rests in a slot in either of the two others. After the babbitt in one shell has been poured it is permitted to cool while the workman is getting a shell in place on the other core of the pair. The yoke is then loosened and swung over to the other outside post and tightened against the shell on this core to bring it to the right position. The babbitt is then poured. While this is cooling the other bearing is removed from the mandrel and a new shell put in place, and by that time it is possible to loosen the yoke and swing it over, repeating the cycle. This makes the work a practically continuous performance without lost time and insures a uniform bearing thickness at a minimum cost.

EFFECTIVE AIR RESERVOIR SUPPORT

A new way of hanging the air reservoirs was recently devised in connection with the fifty new trailers now under construction in the West Side shops. At each end of the tank, where the lap of end and side sheets makes double thickness of metal, a band is brazed to the tank, the band extending half way around, with the ends bent out horizontally. After the bands are brazed on, the tank is hot galvanized inside and out. It is supported under the car floor by two U-shaped pieces, which are bolted to the wood cradle above and to the tank bands below, with the U's opening sideways toward the tank. These support connections are turned this way rather than with backs toward the tank to avoid a narrow place between them and the tank in which dirt and water could accumulate.

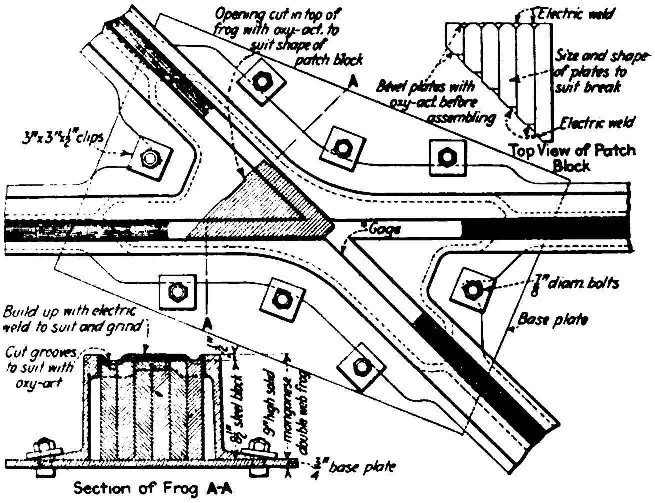
With the old system of hanging tanks by means of bands fastened to the cradle and extending around the tank, but not fastened to it, there is a strong tendency for failure to occur under the bands because of the slight movement between tank and bands and the possibility of water and dirt getting underneath the bands to help corrosion and erosion. With the bands brazed on tight all of this is eliminated and the life of the tank undoubtedly extended.

Broken Manganese Frogs Repaired Without Interrupting Traffic

Solid Plugs Which Were Supported on Steel Plates Inserted Between the Frog and the Ties Were Used to Build Up the Break

TWO manganese girder rail frogs of the box or double web type, at the intersection of Sutter and Market Streets, in San Francisco, recently broke without warning, leaving the crossing in an unsafe condition and likely to do considerable damage to rolling stock or further damage to the crossing itself. Despite the heavy traffic at this part of the system equipment and materials were assembled as soon as the break was discovered and the rebuilding of the two frogs was completed the same day without taking the crossing out of service.

In double web frogs of this type, when a section of the top breaks out, the open space beneath makes it impossible to build up the break in the usual manner because of the absence of any foundation on which to build. It was therefore decided to replace the broken sections with solid plugs, supporting them on steel plates which could be inserted between the frog and the ties for this purpose. These base plates were made of ¾-in. metal about 2 ft. x 3 ft. in size and bolted clips were used to clamp frog and plate rigidly together. Eight of these clips were placed around the flange of each frog, as shown in the accompanying illustration.


Opening cut in top of frog with oxy-act. to suit shape of patch block
Electric weld
Size and shape of plates to suit break
Bevel plates with oxy-act before assembling
Electric weld
Top View of Patch Block
A
3"x3"x½" clips
Gage
⅞" diam. bolts
Base plate
Build up with electric weld to suit and grind
Cut grooves to suit with oxy-act
A
½"
8½" steel block
9" high solid manganese double web frog
¾" base plate
Section of Frog A-A

METHOD OF REPAIRING BROKEN WEARING SURFACE OF SOLID MANGANESE FROG

A triangular shape was selected as the easiest form of plug to build up and a right-angled triangle was measured off on each of the frogs, the size and location being chosen so that when the plug was in place it would give the maximum strength to the broken sections. The dimensions of the larger plug are shown on the accompanying illustration. The plugs were built up of steel plates, the desired shape and exact size being secured by beveling the edges with an oxyacetylene torch and by welding adjoining plates together along the joints. When the plugs had been delivered to the job, the exact dimensions of the openings required in the frogs were marked out and after the base plates were set the holes were cut out with the oxyacetylene torch. With the plugs in place an electric weld was made entirely around the joints between plug and frog, and finally the entire job was smoothed up with the rail grinder. The plug rested on the base plate without being attached to it in any way.

After the two plugs installed in this way had been in service for a few days, it was almost impossible to tell which of the several frogs at this particular crossing had been repaired.

The work was carried on under the general direction of B. P. Legare, chief engineer maintenance of way and construction, United Railroads.

Hedley Addresses Cornell Engineers

Interborough President Draws on His Personal Experience in Order to Illustrate His Advice to Young Men Who Are Ambitious to Succeed

THE speaker at a meeting of the Cornell Society of Engineers, held in New York City on April 21, was Frank Hedley, president and general manager of the Interborough Rapid Transit Company. Some of his remarks were referred to editorially in the issue of this paper for April 30. This association is made up of former Cornell students in all branches of engineering and Mr. Hedley gave them the benefit of his practical experience, beginning in England, where as a boy he learned the fundamentals of steam railroad shop work.

After some general introductory historical remarks regarding electric railway development before he became interested in it, he told of his first practical work in the Erie Railroad shops, in Jersey City, soon after his arrival in this country. He said that after two years with the Erie he secured work in the New York Central shops in Forty-third Street, New York City, where at that time was an old roundhouse just north of the Grand Central Station. Here he had a very interesting experience while working in a shop gang as machinist. He said that each gang foreman had three engines to look after, and on one occasion his gang had two of its three engines ready, but was waiting to have the valves set. The gang foreman was ill and the master mechanic was about to lay off the rest of the men until his recovery because he supposed that there was no one who knew how to set the valves. Young Hedley, however, had been keeping his eyes open and he volunteered to set the valves. He was permitted to do this and did the job successfully, but when a short time afterward he asked for the same pay as the foreman got his request was turned down with the statement that it was impossible to pay him more than the maximum rate of 24 cents per hour.

Discouraged by this limitation on his earning capacity young Hedley left the New York Central and secured a job as machinist in the Ninety-eighth Street shops of the Third Avenue Elevated Railroad. Here his knowledge of valve setting caused a repetition of the New York Central experience, but this time, after a stormy encounter with the gang foreman, he came out ahead and was himself made foreman. It was only a short time until he became master mechanic of the West Side Elevated Railroad, and in 1889 he became master mechanic of the Kings County Elevated Railroad in Brooklyn. Here he had charge of engines and cars; he inaugurated railroad service and remained with the company until 1893, when he went to Chicago with the contractors who were building the Lake Street Elevated Railroad.

In Chicago Mr. Hedley was general superintendent of construction on the Union loop and the Northwestern Elevated Railroad and he gained a great deal of operating experience as well, because Charles T. Yerkes, president of the road, left much of the administration to him.

Mr. Hedley said he came back to New York in 1903, first with the construction company, later organizing the operating forces of the Interborough Rapid Transit Company. Still later he was put in charge of the street railways as well.

Referring to some of the things that have occurred in the rapid transit development in New York City, Mr. Hedley spoke of the original large motors which were employed on account of their great accelerating ability, although the operation was far from ideal. He could see that while in the early stages of operation by electricity this operation was not as satisfactory as that with the old steam locomotives, yet the goal of ultimate success was always in sight. A great deal of money had to be spent in rebuilding and redesigning, and the operating department worked very close to the manufacturers' designers, because the latter had to get many pointers from the former. Development went along very rapidly, so that today the operators feel absolute confidence in the electrical equipment.

This, of course, said Mr. Hedley, involves a high standard of inspection and maintenance. The Interborough today does its inspection on a mileage basis, in connection with periodical lubrication. Motor cars make 1,200 miles before they are laid up. They are then taken in for oiling and adjustment, carbon brushes are fixed up, brakes tightened, etc. There are no terminal inspections.

Mr. Hedley explained that as a result of careful inspection rapid-transit trains frequently operate for thirty days at a stretch without developing a single interference with train movement on account of defective inspection or defective equipment. He described a number of the wonders of the subway equipment, and called attention to the fact that the motor cars of one of the ten-car subway trains have more apparatus in them than any steam locomotive ever constructed. Moreover, they have a horsepower capacity that can produce tractive effort sufficient to accelerate the trains at the rate of 1.7 m.p.h. per second. This is about three times as rapid as is possible with the best steam locomotive attached to the best passenger train in the country. In spite of the perfection of this equipment, Mr. Hedley thinks that there is still a wide field for electrical development and that the surface has as yet only been scratched. We are, he said, just in the beginning of electrical engineering, and there is a tremendous field for the young engineer who is resourceful.

Interspersed with the technical part of Mr. Hedley's discourse were a number of observations regarding life and living. For example he said that the best way in which to make a living is to be able to produce, and to be able to convince the other fellow you know how to produce; that is, how to run the business that he needs to have run. Then you can make him pay you well for running it. Again, it is not absolutely necessary for a man to have a technical college education. But this one thing is necessary, if he doesn't get his technical education in college, he must get it after he starts to work. And it is very difficult to get a technical education, night after night, after putting in hard work in the shop. The principal thing is that any one who starts out, no matter what his education, must, in order to be successful, show that he can do things a little better than some one else. Such a man cannot be held back.

Testing Insulating Materials—I*

There Are Certain Fundamental Characteristics Which All Insulating Materials Must Have to Meet the Operating Conditions—The Presence of These Characteristics Is Determined by Certain Tests as Described

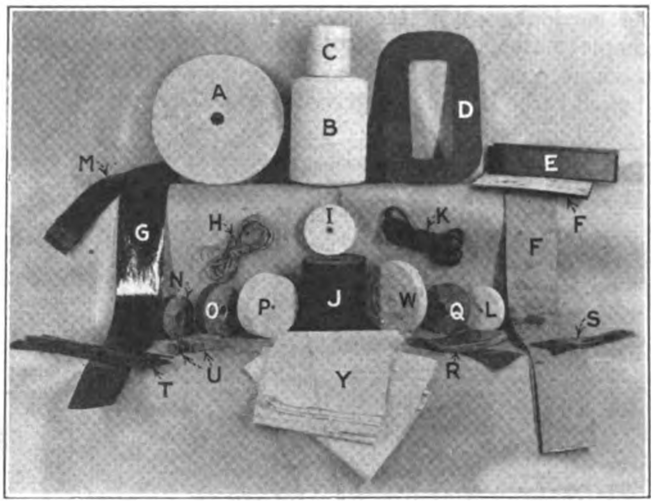
BY JOHN S. DEAN
Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company

IN THE electrical industry the term "to insulate" means to separate conducting bodies by means of non-conductors so as to prevent a transfer of electricity. As applied to railway motors the function of insulating material is to act as a separator between adjacent commutator bars and turns of the copper conductors and to isolate from the ground these conductors, motor leads and wiring connections around the frame.

The variety of insulating materials used in the construction of a railway motor is shown in detail in a chart published in the April 19, 1919, issue of the ELECTRIC RAILWAY JOURNAL, page 778. These materials primarily take the form of either a liquid, paper, cloth, cord or a solid and are segregated and classified in Table I.

TABLE I—CLASSIFICATION OF INSULATING MATERIALS

Liquids		Amber insulator Plastic insulator Asphaltum varnish Insulating varnish Shellac
Papers	Untreated	Fish paper Absestos Fullerboard Cement paper
	Treated	Micarta Japanese paper and mica—mica tape Fish paper and mica
Cloths	Untreated	Cotton tape Cotton sleeving Surgical braid Gray webbing Drilling
	Treated	Treated cloth Friction tape Friction cloth Treated duck
Cords		Torpedo twine Jute rope Linen twine
Solids		Mica Porcelain Rubber bushings Impregnating gum Cement



INSULATING MATERIALS FOR RAILWAY MOTORS

A—Asbestos paper
B—Cotton sleeving
C—Linen twine
D—Asbestos and mica
E—Fish paper cell
F—Fish paper and mica
G—Cement paper
H—Torpedo twine
I—Asbestos tape
J—Friction cloth
K—Jute rope
L—Cotton tape
M—Treated duck
N—Mica tape
O—Treated linen tape
P—Gray webbing tape
Q—Friction tape
R—Treated cloth
S—Shellacked fullerboard
T—Fullerboard strips
U—Fish paper U-pieces
W—Surgical tape
Y—Drilling hoods

The insulation of railway motors not only involves the separation of the various conductors and their isolation from ground but includes a number of other factors, such as the characteristics of the materials used and the methods of applying them to the various detail parts of the motor during the process of manufacture. Further, in the selection of this material it is essential to take into consideration the conditions under which railway motors have to operate, the most important of which are: (1) Comparatively high temperatures; (2) variable trolley voltages and line surges; (3) exposure to considerable moisture, dust and dirt; (4) subjection to severe mechanical strains and vibrations; (5) frequent abuse by rough handling; (6) poor maintenance, in many cases; (7) ruggedness of construction and accessibility and convenience for repair.

From the standpoint of dielectric strength, glass stands highest among the non-conductors of electricity, but its use for insulating purposes is limited on account of its brittleness. It is not used in any form on railway motors, but has been applied quite extensively and has proved invaluable in certain fields of electrical work.

To meet the above conditions satisfactorily the insulating materials for railway motors must have attention with respect to: (1) Dielectric strength, (2) mechanical strength, (3) flexibility, (4) moisture, acid and oil proofness, (5) heat resistance, (6) heat conduction and radiation, (7) cementing and sticking qualities and (8) suitable finish.

The above properties cannot be had combined in any one insulating material, hence a great variety of individual untreated materials and combinations of treated and composite materials are required. These must be selected for different details of the motor, depending upon the mechanical and electrical strains to which the various parts are subjected and the method of applying during the process of manufacture. Under these conditions a great variety of tests of the untreated materials, the materials used during the process of treatment and of the treated and built-up materials are necessary to insure the proper insulation of the completed machine.

Some of the most important tests which experience has shown are required in connection with this variety of insulating materials are given in Table II to show the refinement necessary in producing a railway motor correctly insulated that will finally pass the specified factory tests and at the same time stand up under the severe operating condition to which it is subjected in service.

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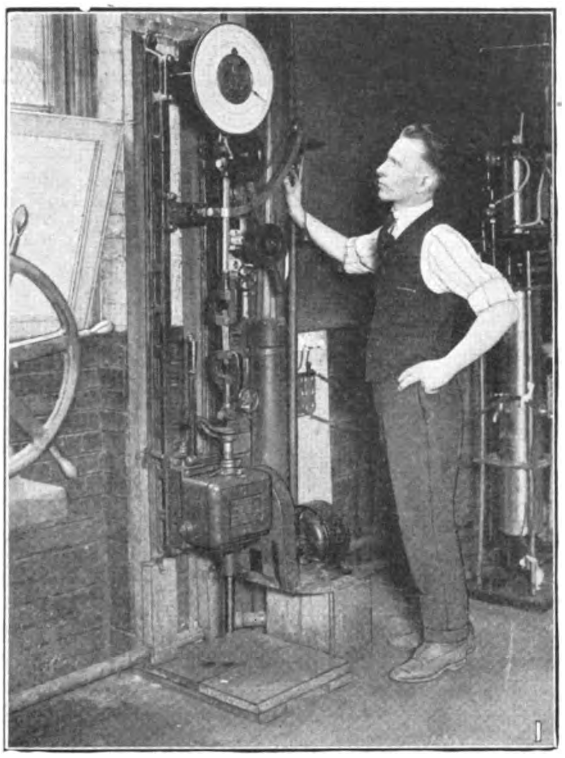
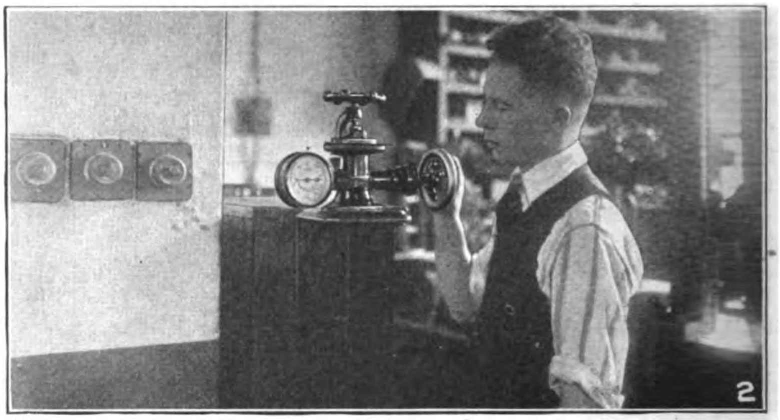
*This is the first of two articles by Mr. Dean on the testing of insulating materials. In the April 16 issue of this paper Norman Litchfield described the essential characteristics that should be specified for insulating materials. This and the following article describe methods and apparatus used for determining these characteristics.

To test the mechanical strength of cotton tape, cotton sleeving, surgical tape, gray webbing, drilling, treated cloth, friction tape, friction cloth, treated duck, torpedo twine, jute rope and linen twine, an automatic power cloth tester, having a capacity ranging from 50 to 300 lb., is used. Test specimens of cloth are cut 1 in. wide and about 6 in. long and samples of tape and cord are cut 6 in. in length. The test strip of sample material is clamped in the jaws of the testing machine, which are 2 in. apart, and power is applied through a motor-driven worm. The pull or breaking point in pounds is registered on an indicating scale attached to the upper clamping jaw of the machine. Tests are made on a number of samples and an average value is taken as the final result.





No. 1—Apparatus used in making tensile tests on tapes, cloths and cords. No. 2—Apparatus used in making rupture tests on papers. No. 3—This apparatus is used in testing the strength of cements.

MAKING TENSILE STRENGTH AND RUPTURE TESTS OF CLOTHS, PAPERS AND CEMENTS

A test made on five samples of cambric such as is used in making treated cloth shows the following:

Test No.	1	2	3	4	5	
Warp	50	52	40	41	42	= 45 lb., average
Woof	22	27	24	31	29	= 27 lb., average

The warp represents the thread running lengthwise in a woven material, while the woof is the name given to the threads carried by the shuttle; *i.e.*, those running crosswise of the fabric.

To determine the comparative strength of the various papers used for winding cells, U-pieces and for foundations for built-up mica wrappers, etc., a Mullen testing machine having a capacity of 100 lb. pressure is used. The test specimens are cut 3 in. square from the commercial rolls of paper. The test piece of paper is clamped in the machine over a plunger which is forced up against it by means of a hand-operated pump. When the paper is ruptured the gage pressure is read and recorded. Fish paper such as is ordinarily used in built-up mica wrappers shows a rupture test of about 40 lb.

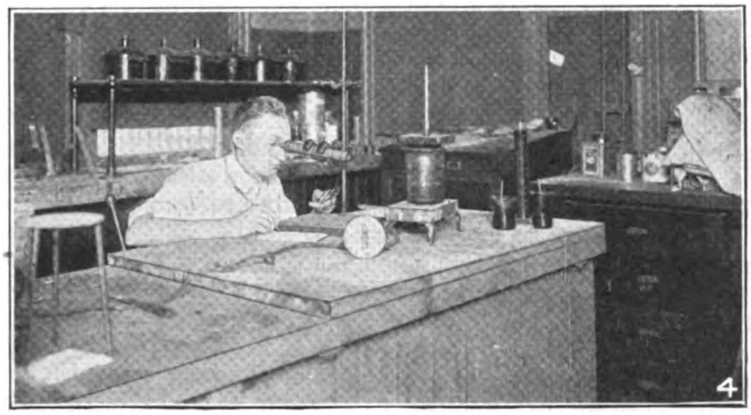
During the process of manufacturing micarta insulating material it is necessary to select a paper that will take up a certain definite amount of shellac during treating. To determine the degree of porosity, a glass burette graduated from 0. to 100 cu.cm., over a length of 22 in. of the tube, is used, together with two steel clamping disks with a 1-in. hole in the center and a 125-cu.cm. glass flask. The flask is connected to the lower end of the burette by means of a flexible rubber

TABLE II—TESTS ON ELECTRIC RAILWAY MOTOR-INSULATING MATERIALS

Untreated materials	Tensile test Rupture test Air porosity test Pulling test Destruction test Creepage test
Materials used in treating	Drop point test Viscosity test Dielectric test—liquid insulating materials Penetration test Aging test Oilproof test Acid, alkali and salt water test Cementing and sticking qualities test Heat conduction and radiation test Baking or drying qualities Weather test
Treated and composite materials	Adhesion test Slip test Treating test specimens Dielectric test—sheet insulating materials Moisture absorption test Gaging built-up mica board Dielectric test—built-up mica and paper Experimental treating power

tube. To the top of the burette is connected the lower clamping disk and this connection is fitted with a pinch cock. Test specimens are cut 2¼ in. wide lengthwise from the sheets of paper to be tested.

In the test the pinch cock is opened and the flask is placed on the upper ring support opposite the zero on the burette and filled with water until the flask and burette are filled up to the zero graduation on the burette. The test strip of paper is then clamped between the two steel disks and the pinch cock is closed. The flask is then lowered to a position which brings the water level of the flask 24 in. below the zero mark on the burette and the pinch cock is opened for ten seconds to allow the air to flow into the burette through the sample of paper. The pinch cock is then closed and the flask is raised until its water level coincides with that of the burette and this level is read on the burette. This gives the number of cubic centimeters of air drawn into the burette. This figure is taken as the porosity number. Each strip is tested at intervals of 5 in.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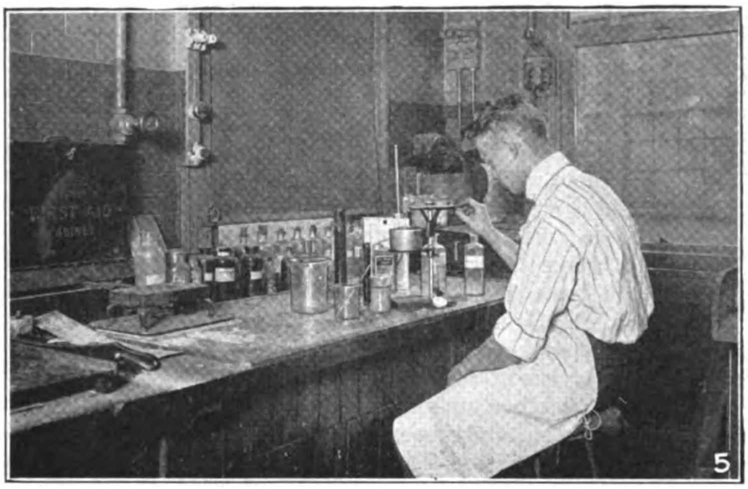
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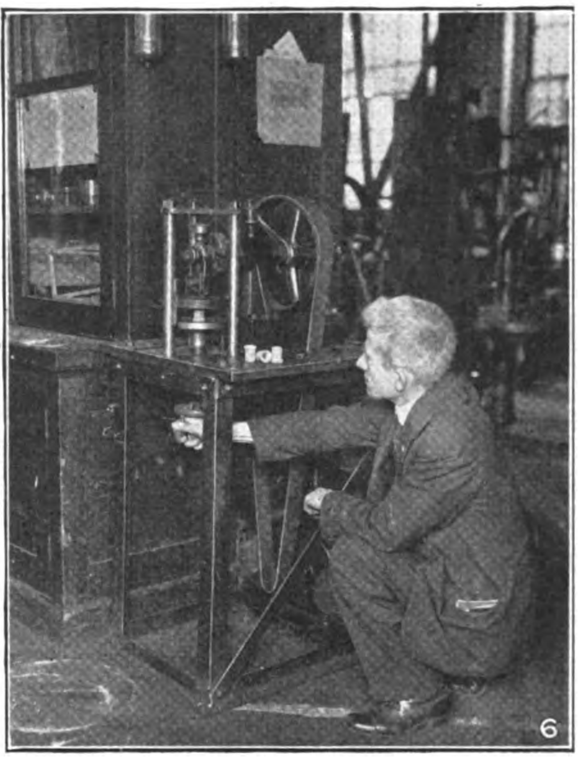
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No. 4—Insulating gums are tested to determine the softening at different temperatures. No. 5—Viscosity of insulating varnishes is determined by a viscosimeter. No. 6—Rubber bushings are tested to destruction.

TESTING INSULATING GUMS, VARNISHES AND RUBBER BUSHINGS IN THE LABORATORY

A good grade of Kraft paper such as used in connection with the manufacture of micarta for railway motor parts has a porosity figure of from 40 to 50.

Cements for railway motor construction are used primarily in back of the commutator neck to seal up the openings around the windings and are put in place in a plastic condition and allowed to harden. The apparatus used for testing these is a Riehle cement testing machine.

Test specimens are made up in a special shape, so as to fit into the jaws of the testing machine. They are molded from the cement and have a cross-section of ½ x 1 in., an equivalent of one-half square inch, at the point of fracture.

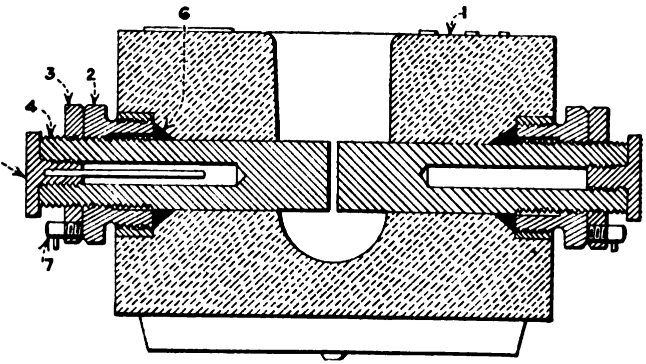
The test is made by placing the sample in the jaws of the testing machine and applying the power through a system of levers, which are balanced for the grade of material under test. The pulling force applied to the upper jaw is automatically adjusted by a transfer of small shot from one receptacle to another. As the shot fall into the retainer on the spring balance they are weighed, registering the pull. When the sample breaks, the transfer of shot is automatically shut off and the maximum recorded pull is read from the dial on the scale. In determining the durability of rubber bushings used to protect the motor lead cables where they come out through the frame of the motor, a special intermittent compression testing machine is used. The test rubber bushing is placed in an upright position between the two horizontal parallel plates of the testing machine and the height of the lower plate is adjusted to get a predetermined compression of the bushing when the plates are nearest together. The motor is started and this raises and lowers the upper plate intermittently, compressing the sample about sixty times a minute.

A recording speed indicator is attached to the driving shaft of the machine, which registers the total number of compressions. The sample specimen is tested until it shows signs of destruction. This test gives comparative results as to the suitability of the various grades of rubber bushings.

Porcelain insulators used on railway motor brush holders are tested to determine the ability of the insulator to resist any electrostatic discharges over the surface of the porcelain. The equipment used is similar to the apparatus (which is explained in detail later on) used to make the dielectric test on sheet insulating material.

The porcelain insulator is placed on a metal rod and a small bare copper wire is twisted around the middle of its outer surface. One side of the testing circuit is connected to the metal supporting rod and the other side is connected to the copper wire on the porcelain. The test voltage is raised until a flash-over occurs across the surface of the porcelain, blowing the breaker. The maximum voltage is read and recorded at the flashing point.

To determine the softening, at different temperatures, of insulating gums such as are used in impregnating railway motor field coils it is important to use a grade of gum that will not soften and run out of the windings under the most severe operating conditions of the motor. The apparatus used in testing gum for this quality consists of two glass beakers, one within the other, and a glass tube to receive a thermometer to which a small platform of aluminum is attached on the outside to hold the test sample of gum. A small telescope is used in noting the various readings. The test specimen is molded in a metal mold and has the following dimensions: Total length 2 in.; width ½ in. for 1 in. of the length, while the other inch tapers from ½ in. down to ⅛ in. at the end. The thickness of the test piece is ⅓ in. The ⅛-in. square tip of the wedge is painted white to increase its visibility. In the test the wedge is placed with the 1-in. tapered end overhanging on the platform attached to the glass tube which is placed in the inner beaker. Glycerine is poured in the outer beaker and heated by an electric stove so regulated as to raise the temperature in the inner beaker at the rate of 2 deg. C. per minute. Observations are made and recorded of the "sag point," which is the temperature at which the test piece begins to bend; the "bottom point," which is the temperature at which the test piece touches the bottom of the inner beaker 2½ in. below the platform, and the "drop point," which is the temperature at which the overhanging test column breaks.



TEST CUP USED IN DIELECTRIC TEST OF LIQUID INSULATING MATERIALS

To determine the viscosity or the internal friction of the various grades of insulating varnishes a Stormer viscosimeter is used. In this the outer beaker is filled with water, which is changed from time to time to maintain the test varnish in the inner beaker at a uniform temperature of 21 deg. C. The test varnish, which is taken at the specific gravity used in the factory, is placed in the inner beaker. A small metal cylinder, which is immersed in the test varnish, is rotated due to the action of the force of gravity on a 100-gram weight connected to it through a system of pulleys and gears. The pointer on the scale of the apparatus is set to zero and the time required to make 100 revolutions of the cylinder is taken as the viscosity figure. This apparatus is sometimes used to record the number of revolutions the cylinder makes in one minute.

The results of a test on insulating varnish such as is used in railway motors show a viscosity figure of 25, which interpreted means 100 revolutions of the drum are made in twenty-five seconds using a 100-gram weight.

To determine the dielectric strength of oils and varnishes the same testing circuit as used in making the dielectric test on sheet insulation material is used. The testing board with the brass terminals is replaced by a standard oil testing cup developed for this purpose.

The test cup, which is shown in detail in one of the illustrations, is adjusted by spacing the electrodes ⅒ in. apart. The cup, after being carefuly cleaned with benzine or gasoline, is filled with the test varnish to within ½ in. of the top. After being filled it is allowed to stand until all air bubbles have disappeared. The terminals of the testing circuit are connected to the binding posts on the test cup, and the voltage is applied first at a low value and then increased at the rate of 3,000 volts per second until the oil in the cup is punctured and a breakdown occurs. During the test the temperature of the varnish is kept at from 20 to 25 deg. C. Five tests are made on the sample varnish and the average of these five voltage readings is recorded as the dielectric strength of the varnish.

To determine the ability of the various grades of varnish to penetrate the fibrous structure of the various grades of cloth used for insulating purposes two glass tubes, ½ in. inside diameter and 12 in. long, open at both ends, are used. These are held in an upright position in a frame which is fitted with a clamping arrangement to hold a number of layers of cloth against one end of the tubes, which are filled with the varnish to be tested. To make the test the test tubes are closed with corks and then filled with the two grades of varnish to be tested. Over each of the upper ends of the tube, which are open, are securely clamped to the same thickness 100 layers of cotton cloth cut 2½ in. square. The apparatus is then up-ended, the corks are removed to give ventilation and the varnish is allowed to soak into the cloth for fifteen minutes. The corks are then placed in the tubes, the apparatus is reversed, the samples of cloth are removed and the number of layers penetrated are counted, which is a measure of the penetrating qualities of the two varnishes. In making this test it is important that both samples should have the same dilution and temperature, as these characteristics affect the penetration figure. This test is only comparative, but it is a good index as to the most suitable varnish to meet these requirements.

Finds Good Painting Pays

THE Chattanooga Railway & Light Company has decided that the old way of painting and varnishing cars thoroughly is after all the best. After trying various kinds of less expensive paints and after experiments with the use of enamel, the management has come to the conclusion that the best final results are obtained by removing everything, starting at the bottom, and putting on seven coats of body paint and two coats of best varnish on top of this. This is naturally more expensive as far as first cost goes, but in the long run there is greater satisfaction and less annual cost over a period of years than by some substitute methods.

Equalized Brakes and Braking Power*

Methods of Obtaining Equalized Brakes on Cars Equipped with Various Types of Brake Rigging Are Described and Examples Solved for Braking Power, Percentage of Braking Power and Total Leverage

BY H. M. P. MURPHY

As ALL practical designs of foundation brake riggings must be properly "equalized" the following definition of an equalized brake will assist in making this term clear: An equalized locomotive or car brake is one which is designed so that, during a brake application, equal forces will be delivered to all brake shoes which are applied to wheels carrying equal weights and performing similar duties, regardless of shoe wear, variable piston travel, etc.

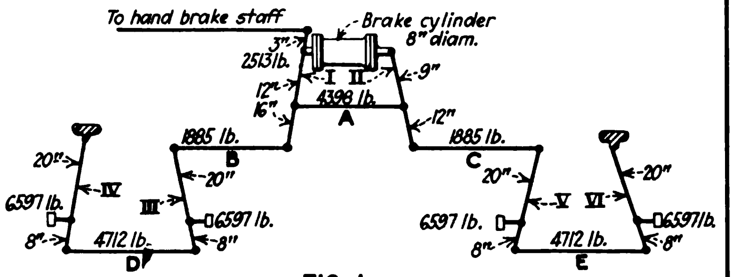
As an illustration of the preceding definitions, consider the air brake portion of the standard car brake rigging shown in Fig. 1. It will be observed that this brake is fully equalized because the forces delivered to each of the four brake beams are always equal to each other, and each pair of wheels not only carries the same weight but also performs the same duty and should, therefore, be braked with just the same force as each of the other pairs of wheels on the car. As another illustration, consider the brake rigging shown in Fig. 2. In this case there are two distinct classes of wheels, *i.e.*, drivers and trailers, which not only perform different duties but also carry different weights. Consequently, although the forces delivered to all of the shoes concerned are not equal, the brake rigging must not be assumed to be of the non-equalized type. In fact, as the forces delivered to each of the four driver brake shoes are equal to each other, and as the forces delivered to the trailer shoes are always equal to each other, the brake rigging is properly equalized, according to the definition. The reasons for employing different degrees of shoe pressure on wheels which do not carry equal weights or which do not perform similar duties will be fully discussed later under the head of "Braking Power," etc.

GETTING EQUALIZED HAND BRAKING ON CARS EQUIPPED WITH EQUALIZED AIR BRAKE RIGGINGS

When a foundation brake rigging is so designed that the air brake portion is equalized the hand brake portion will also be equalized if the hand brake chain, or rod, is attached to any one of the air brake levers at some point which constitutes a fixed center during an application of the air brake or if the attachment be made to the push rod pin of the cylinder lever. If, however, the hand brake chain, or rod, be attached to any other point of any of the air-brake levers the hand brake will not be equalized.

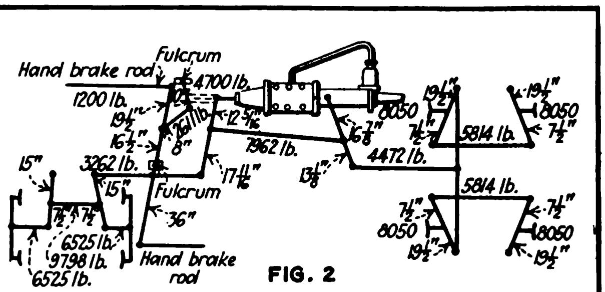
In order to illustrate the preceding rule, consider the brake rigging shown in Fig. 3. In this case the hand-brake chains, or rods, are connected to air-brake levers at points which constitute fixed centers during an application of the air brake and therefore as the air-brake portion of the rigging is known to be equalized the hand-brake rigging will also be equalized.

As a further illustration, it is apparent that the form of car hand brake shown in Fig. 1 is not equalized, for by inspecting this it will be observed that the hand-brake-chain rod is connected to the cylinder lever at a point 3 in. beyond the push rod pin center. In general, the greater the distance between these two points the farther will the hand brake be from the



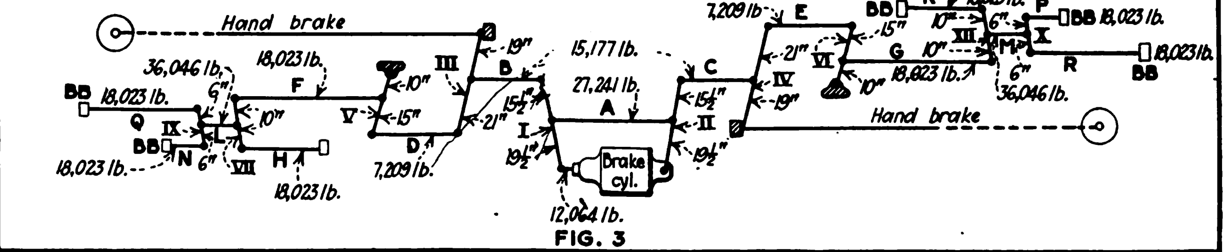
To hand brake staff
Brake cylinder 8" diam.
3"
2513 lb.
I
II
9"
12"
16"
4398 lb.
A
12"
1885 lb.
B
1885 lb.
C
20"
IV
III
20"
6597 lb.
6597 lb.
8"
4712 lb.
8"
D
20"
V
VI
20"
6597 lb.
6597 lb.
8"
4712 lb.
8"
E

FIG. 1



Fulcrum
Hand brake rod
4700 lb.
1200 lb.
19½"
16½"
2611 lb.
8"
12 5/16"
7962 lb.
16 7/8"
13 1/8"
4472 lb.
17 11/16"
15"
3262 lb.
15"
Fulcrum
7½"
7½"
36"
6525 lb.
9798 lb.
6525 lb.
Hand brake rod
19½"
8050
7½"
5814 lb.
19½"
8050
7½"
5814 lb.
7½"
8050
19½"
7½"
8050
19½"

FIG. 2



Hand brake
36,046 lb.
18,023 lb.
BB
18,023 lb.
6"
F
Q
IX
BB
N
6"
VII
H
18,023 lb.
18,023 lb.
10"
III
10"
V
15"
D
7,209 lb.
19"
B
15,177 lb.
27,241 lb.
15½"
21"
I
19½"
A
Brake cyl.
12,064 lb.
C
15½"
II
19½"
7,209 lb.
E
21"
VI
IV
19"
15"
BB
K
18,023 lb.
10"
XII
G
10"
18,023 lb.
10"
6"
M
6"
36,046 lb.
P
X
BB
18,023 lb.
R
18,023 lb.
BB
Hand brake

FIG. 3

FIG. 1—BRAKE LEVERAGE DIAGRAM FOR DOUBLE-TRUCK FOUR-MOTOR CAR. FIG. 2—BRAKE LEVERAGE DIAGRAM FOR CAR WITH MOTOR AND TRAILER TRUCKS; 32,200 LB. ON MOTOR TRUCK AND 14,500 LB. ON TRAILER TRUCK. FIG. 3—BRAKE LEVERAGE DIAGRAM FOR CAR WITH SIX WHEEL TRUCKS

equalized type. Consequently it is important to make the dimension referred to as small as possible, 3 in. being the maximum distance that should be used. The proper construction is, of course, that in which the push rod and hand brake chain rod are attached to the same pin.

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*This is the fifth of a series of articles on forces developed in brake riggings. Others appeared in the Jan. 15, Feb. 19, March 19 and April 16 issues of this paper.

In order to ascertain just what inequality of braking force results from the use of the improperly connected hand brake referred to in the preceding paragraph and illustrated in Fig. 1, let it be required to find the force delivered to each of the four brake beams when a pull of 1,200 lb. is exerted on the hand-brake chain.

Considering the middle point of lever *I* as the fulcrum,

$$\text{Force on rod } B = \frac{1{,}200 \times 15}{16} = 1{,}125 \text{ lb.}$$

and, considering the lower end point of lever *III* as the fulcrum,

$$\text{Force on brake beam of lever } III = \frac{1{,}125 \times 28}{8} = 3{,}938 \text{ lb.}$$

and by finding the force on rod *D*, the force on the brake beam attached to lever *IV* is also found to be 3,938 lb.

Now the force on rod *A* may be found by considering the lower end point of lever *I* as the fulcrum, thus:

$$\text{Force on rod } A = \frac{1{,}200 \times 31}{16} = 2{,}325 \text{ lb.}$$

and by considering the upper end point of lever *II* as the fulcrum,

$$\text{Force on rod } C = \frac{2{,}325 \times 9}{21} = 996 \text{ lb.}$$

and considering the lower end point of lever *V* as the fulcrum,

$$\text{Force on brake beam of lever } V = \frac{996 \times 28}{8} = 3{,}486 \text{ lb.}$$

and the force delivered to the brake beam of lever *VI* may also be shown to be equal to 3,486 lb.

Thus is it seen that owing to the specified method of attaching the hand-brake chain to the cylinder lever the hand brake is not properly equalized, the force delivered to each of the brake beams of the left-hand truck being 452 lb. greater than the force delivered to each of the beams of the right-hand truck, under the conditions assumed. However, as this variation in braking force is not excessive, the given method of connecting the hand brake with the main leverage system is generally considered as satisfactory. Moreover, although the hand brake in question is not equalized, attention should be called to the fact that in a preceding example it was shown that the air-brake portion of the apparatus is equalized.

BRAKING POWER OR BRAKING FORCE DEFINED

The term total braking power or total braking force simply means the total force (in pounds) with which the brake shoes, on the wheels considered, are forced against the tires.

As braking power must obviously depend not only on the design of the foundation brake rigging and on the size of the brake cylinder but also on the air pressure existing in the brake cylinder it is always essential to specify the "cylinder pressure" considered when discussing the subject of braking power. In cases where a hand brake is the source of power the force applied to the hand wheel should be stated whenever the subject of braking power is involved.

The term "percentage of braking power" means the ratio of the total braking power, on the wheels considered, to the total weight with which these wheels press on the rails; that is, to find the percentage of braking power, in any case, divide the total braking power by the total weight on the wheels in question and multiply this result by 100, in order to express it in the form of a percentage.

It is also clear that in this case the "brake cylinder pressure" must always be specified, for the percentage of braking power depends on the total braking force, which, as previously pointed out, is directly dependent on the air pressure existing in the brake cylinder. Consequently it is customary to state that a car is braked at a certain per cent of its weight when the "cylinder pressure" has some specified value, or to say that the percentage of braking power on a particular car is a certain amount, based on a specified cylinder pressure.

The preceding definition may be expressed in the following mathematical form, if the cylinder pressure is clearly stated:

$$\text{Percentage of braking power} = 100 \times \frac{\text{total braking force on specified wheels}}{\text{total weight on specified wheels}}$$

The term "total leverage" represents the number of times that the total force, exerted on a specified brake cylinder push rod, is multiplied in being delivered to all of the brake shoes controlled by the cylinder in question, or, in other words, the total leverage, for any given case, simply represents the total number of pounds of brake shoe pressure obtained for each pound of force developed by the push rod of the brake cylinder concerned.

To determine the value of the total leverage for any given brake rigging, connected with a specified cylinder, divide the total braking force developed on all of the beams or shoes controlled by the cylinder by the corresponding total force exerted on the cylinder push rod.

This rule may be concisely stated in the following mathematical form:

$$\text{Total leverage} = \frac{\text{total braking force developed by specified cylinder}}{\text{total force on push rod of specified cylinder}}$$

In using the preceding rule, neither the size of the cylinder nor the amount of air pressure need be known, as the total braking force developed may always be found in terms of the total push rod force. In other words, as the term "total leverage" simply represents the force-multiplying ability of a brake rigging, it is dependent only on the design of the rigging and is in fact a constant quantity for any given set of levers or other force-multiplying devices. Consequently when computing total leverage the force exerted by the cylinder push rod may be assigned any convenient value whatever. Particular attention should, moreover, be called to the fact that in all cases it is essential to consider each cylinder with the brake rigging controlled by it alone as a separate and independent system. This is a most important factor in all total leverage problems, but especially in the case of a car or locomotive which is equipped with more than one brake cylinder.

In order to illustrate the methods outlined in the preceding paragraphs for the computation of braking power, percentage of braking power and total leverage, the following examples are of interest:

Consider the brake rigging illustrated in Fig. 1 and let it be required to find the total leverage for this case. As the magnitude of the push rod force does not affect the value of the total leverage of any given brake rigging and, therefore, as any force whatever may be assumed as acting on the push rod, it is generally considered best to employ a force of 1 lb. unless the total braking force has previously been computed by the use of some greater value for the push rod force. Consequently, let it be assumed, in this case, that a force of 1 lb. is delivered by the cylinder push rod to the upper end of lever I, then to find the total braking force developed by the cylinder (*i.e.*, the total braking force on the whole car, as all of the brake beams are controlled by the specified cylinder) consider the middle point of lever I as the fulcrum and apply the "General Leverage Rule," thus:

$$\text{Force on rod } B = \frac{(\text{force on push rod}) \times (\text{lever arm of force on push rod})}{\text{Lever arm of force on rod } B}$$

$$\text{Force on Rod } B = \frac{1 \times 12}{16} = \frac{3}{4} = .75 \text{ lb.}$$

Also by considering the lower end point of lever *III* as the fulcrum,

$$\text{Force on brake beam of lever } III = \frac{.75 \times 28}{8} = 2.625 \text{ lb.}$$

Now by continuing this method throughout the system, the force acting on each of the three remaining brake beams will also be found to be equal to 2.625 lb., and, therefore, the total braking force developed by the push rod force of 1 lb. is 4 × 2.625 = 10.5 lb., that is, 10.5 lb. of brake shoe pressure are developed by each pound of force exerted on the cylinder push rod, and consequently the total leverage is 10.5 (see definition of total leverage). If, however, it is desired to apply the rule for determining total leverage when the total braking force and corresponding total push rod force are known, it may, of course, be accomplished thus:

$$\text{Total leverage} = \frac{10.5}{1} = 10.5$$

It will be noted that in the preceding example neither the size of brake cylinder nor the cylinder air pressure were considered, the solution depending only on the proportions of the levers and the number of brake beams (*i.e.*, the number of pairs of brake shoes) but, of course, this problem could have been solved by assuming a definite size of brake cylinder and definite degree of cylinder pressure; thus with the brake rigging shown in Fig. 1 and with an 8-in. diameter cylinder and an air pressure of 50 lb. per square inch, the total force on the push rod is 2,513 lb. and the force delivered to each of the four brake beams of the rigging illustrated is 6,597 lb. Consquently the total braking force developed on the whole car is 4 × 6,597 = 26,388 lb., whence by aid of the rule for computing total leverage,

$$\text{Total leverage} = \frac{\text{total braking force developed by specified cylinder}}{\text{total force on push rod of specified cylinder}}$$

$$\text{Total leverage} = \frac{26{,}388}{2{,}513} = 10.5$$

From the preceding discussions it is clear that the value of the total leverage for any given brake rigging may always be computed by first assuming that either a force of 1 lb. or any other specific value is exerted on the cylinder push rod, thereby calculating the resulting forces delivered to each of the brake beams or shoes controlled by the cylinder in question, and finally by dividing the sum of all of these last mentioned forces by the assumed force on the push rod.

Suppose now that the car, on which the brake rigging shown in Fig. 1, is installed, weighs 35,000 lb. and let it be required to find the percentage of braking power on this car when a brake cylinder pressure of 50 lb. per square inch is developed.

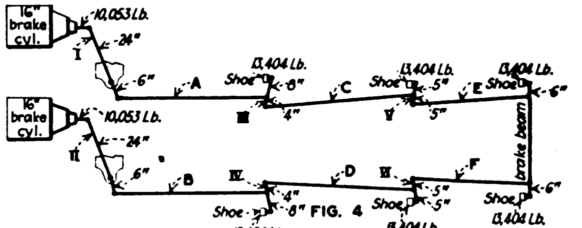
As shown in the preceding discussion the total braking force (or braking power) on all of the specified wheels (*i.e.*, for the whole car in this case) is equal to 26,388 lb. when an 8-in. cylinder is used and the air pressure is 50 lb. per square inch. Consequently,

$$\text{Percentage of braking power} = 100 \times \frac{\text{total braking force on specified wheels}}{\text{total weight on specified wheels}}$$

$$\text{Percentage of braking power} = 100 \times \frac{26{,}388}{35{,}000}$$

$$= 75.4 \text{ per cent (based on 50-lb. cylinder pressure)}$$

As an additional example consider the American equalized driver brake rigging illustrated in Fig. 4 and let it be required to find the total leverage and the percentage of braking power when two 16-in. diameter cylinders are used and the air pressure is 50 lb. per square inch, the total weight on the drivers being 107,000 lb. The total braking force on each shoe is 13,404 lb. and therefore the total braking force on all six shoes is 6 × 13,404 = 80,424 lb. Consequently,


16" brake cyl.
10,053 Lb.
24"
I
6"
A
Shoe
13,404 Lb.
8"
C
4"
III
Shoe
13,404 Lb.
5"
V
5"
E
Shoe
13,404 Lb.
6"
brake beam
16" brake cyl.
10,053 Lb.
24"
II
6"
B
IV
D
VI
F
4"
8"
Shoe
13,404 Lb.
5"
5"
Shoe
13,404 Lb.
6"
Shoe
13,404 Lb.
FIG. 4

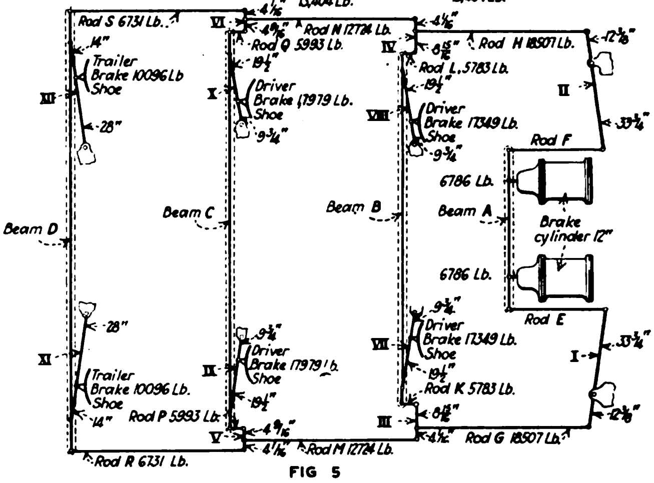

Rod S 6731 Lb.
4 1/16"
VI
4 9/16"
Rod N 12724 Lb.
Rod Q 5993 Lb.
4 1/16"
IV
8 15/16"
Rod H 18507 Lb.
12 3/8"
14"
Trailer Brake 10096 Lb Shoe
XII
28"
19 1/2"
X
Driver Brake 17979 Lb. Shoe
9 3/4"
Rod L 5783 Lb.
19 1/2"
VIII
Driver Brake 17349 Lb. Shoe
9 3/4"
II
33 3/4"
Rod F
6786 Lb.
Beam D
Beam C
Beam B
Beam A
Brake cylinder 12"
6786 Lb.
Rod E
28"
XI
Trailer Brake 10096 Lb. Shoe
14"
9 3/4"
IX
Driver Brake 17979 Lb. Shoe
19 1/2"
Rod P 5993 Lb.
4 9/16"
V
4 1/16"
Rod M 12724 Lb.
Rod R 6731 Lb.
9 3/4"
VII
Driver Brake 17349 Lb. Shoe
19 1/2"
Rod K 5783 Lb.
III
8 15/16"
4 1/16"
Rod G 18507 Lb.
I
33 3/4"
12 3/8"
FIG 5

FIG. 4—LEVERAGE SYSTEM FOR AMERICAN EQUALIZED DRIVER BRAKE. FIG. 5—AMERICAN EQUALIZED BRAKE APPLIED TO ATLANTIC TYPE LOCOMOTIVE

$$\text{Percentage of braking power} = 100 \times \frac{80{,}424}{107{,}000}$$

$$= 75.2 \text{ per cent (based on 50-lb. cylinder pressure)}$$

Now in determining the total leverage, for this case, where two brake cylinders are used, it is merely necessary to consider each side of the engine as a separate system, which it really is, and to find the total shoe pressure developed by each cylinder alone. By referring to Fig. 4 it is seen that each cylinder controls three shoes (*i.e.*, the shoes on one side of the engine), the total shoe pressure developed by one cylinder is, therefore, 3 × 13,404, or 40,212 lb., and as the force acting on the push rod of either cylinder is 10,053 lb.

$$\text{Total leverage} = \frac{40{,}212}{10{,}053} = 4$$

In each of the preceding examples it happened that the weights of the cars and locomotives were approximately evenly distributed on all of the wheels considered, but it should be pointed out that this is not always the case; for instance, on cars with maximum traction trucks there is much more weight on each of the drivers than on the trailer wheels, and consequently the shoe pressure on these two classes of wheels will not be the same although the same brake cylinder is used for both. This makes no difference, however, in figuring the total leverage and total braking force, but when calculating the percentage of braking power care should be taken not to confuse the average percentage on the two classes of wheels with the specific percentage on each separate class, as these are not necessarily the same.

EXAMPLES OF DIFFERENT PERCENTAGES OF BRAKING POWER ON DRIVERS AND TRAILERS

In order to illustrate the statements just made, consider the leverage system shown in Fig. 5, which is a standard form of the American equalized brake as applied to an Atlantic type of locomotive. Let it be required to find the total leverage, total braking force, average percentage of braking power and specific percentage of braking power for the drivers and trailers, when each brake cylinder is 12 in. in diameter and the air pressure is 60 lb. per square inch. The total weight on the drivers is 78,500 lb., which is evenly distributed on the four wheels, and the weight on the trailers is 28,000 lb.

Under the given conditions the total force exerted on each cylinder push rod is 6,786 lb. and the resulting braking force developed on each of the two forward driver shoes is 17,349 lb., while on each of the rear driver shoes the braking force is 17,979 lb. The braking force developed on each of the trailer shoes is 10,096 lb. Consequently the total braking force for the drivers and trailers is equal to

$$2 \times 17{,}349 + 2 \times 17{,}979 + 2 \times 10{,}096 = 90{,}848 \text{ lb.}$$

or the total braking force developed by each cylinder on either side of the locomotive (*i.e.*, on two drivers and one trailer) is equal to 45,424 lb., and, as the total force on each brake cylinder push rod is 6,786 lb.

$$\text{Total leverage} = \frac{45{,}424}{6{,}786} = 6.7$$

Now to find the average percentage of braking power it is, of course, merely necessary to divide the total braking force, 90,848 lb. for the drivers and trailers, by the total weight on the drivers and trailers and to multiply this result by 100, the total weight being 78,500 + 28,000 = 106,500 lb., thus,

$$\text{(Average) per cent of braking power} = 100 \times \frac{\text{total braking force on four drivers and two trailers}}{\text{total weight on four drivers and two trailers}}$$

$$\text{(Average) per cent of braking power} = 100 \times \frac{90{,}848}{106{,}500}$$

$$= 85.3 \text{ per cent (based on 60-lb. cylinder pressure)}$$

Also as the total braking force on the trailers is equal to 2 × 10,096 = 20,192 lb.

$$\text{(Specific) per cent of braking power on trailers} = 100 \times \frac{\text{total braking force on two trailers}}{\text{total weight on two trailers}}$$

$$\text{(Specific) per cent of braking power on trailers} = 100 \times \frac{20{,}192}{28{,}000} = 72.1 \text{ per cent}$$

(Based on 60-lb. cylinder pressure) and as the total braking force on the drivers is equal to 2 × 17,349 + 2 × 17,979 = 70.656 lb.

$$\text{(Specific) per cent of braking power on drivers} = 100 \times \frac{\text{total braking force on four drivers}}{\text{total weight on four drivers}}$$

$$\text{(Specific) per cent of braking power on drivers} = 100 \times \frac{70{,}656}{78{,}500} = 90 \text{ per cent (based on 60 lb. cylinder pressure)}$$

Thus, it is seen that in order to get a correct idea of the true percentage of braking power it is necessary to consider each set of wheels separately, when the braking force applied to each is unequal and the weight of the car or locomotive is unevenly distributed.

In the preceding example, the percentages of braking power on the drivers and trailers were not the same, but in many cases, although the weight of the car or engine may not be evenly distributed on all of the wheels, the same percentage of braking power is used on all wheels; that is, the force with which the shoes are pressed against each pair of wheels bears a uniform ratio to the weight upon them.

DETERMINING TOTAL BRAKING FORCE WHEN TOTAL WEIGHT AND PERCENTAGE OF BRAKING POWER ARE SPECIFIED

By referring to the definition of "percentage of braking power," it will be observed that, by transposing the members of the typical equation there given, a very useful rule for the determination of total braking force may be readily obtained and stated as follows:

To find the total braking force developed on a given set of wheels by a specified cylinder pressure, divide the corresponding percentage of braking power by 100 and multiply the quotient thus obtained by the total weight on the wheels in question.

This rule may be stated in the following concise mathematical form for any given cylinder pressure and specific set of wheels:

$$\text{Total braking force} = \frac{\text{Percentage of braking power}}{100} \times \text{(total weight)}$$

In order to illustrate the preceding rule, let it be required to find the total braking force developed on a car weighing 40,000 lb. when the cylinder pressure is 50 lb. per square inch and the corresponding percentage of braking power obtained on all wheels is 60 per cent.

To solve this problem apply the rule, thus:

$$\text{Total braking force on car} = \frac{\text{(percentage of braking power)}}{100} \times \text{(total weight of car)}$$

$$\text{Total braking force on car} = \frac{60}{100} \times 40{,}000 = 24{,}000 \text{ lb.}$$

Now let it be required to find the total braking force developed on the trailer wheels of an Atlantic type locomotive, when the total weight on these wheels is 30,000 lb. and the brake cylinder pressure is 50 lb. per square inch, the corresponding percentage of braking power obtained being 60 per cent.

To solve this problem, apply the rule, thus:

$$\text{Total braking force on trailers} = \frac{\text{(percentage of braking power)}}{100} \times \text{(total weight on trailers)}$$

$$\text{Total braking force on trailers} = \frac{60}{100} \times 30{,}000 = 18{,}000 \text{ lb.}$$

A most important consideration connected with the subject of braking power is the marked variation in the percentage of braking power which always results from the loading or unloading of a car. Of course, the greater the total weight of a car, equipped with a specified design of foundation brake rigging, the smaller will the percentage of braking power be for any given cylinder pressure. (See definition of percentage of braking power.) In order to show how great a difference exists between the percentages of braking power obtained on empty and loaded cars, the following example will be given.

A car weighing 46,000 lb. when empty is braked at 60 per cent with 50-lb. cylinder pressure. Let it be required to find the percentage of braking obtained on this car when it carries a load of 92,000 lb. and all other conditions remain unchanged.

In order to find the percentage of braking power developed, it is, of course, necessary to ascertain the total weight of the car when loaded and the total braking force developed under the specified conditions. These quantities may be found as follows:

$$\text{Total weight} = \text{(weight of empty car)} + \text{(weight of load)}$$
$$\text{Total weight} = 46{,}000 + 92{,}000 = 138{,}000 \text{ lb.}$$

and as the percentage of braking power obtained on the empty car (which weighs 46,000 lb.) is 60 per cent, the total braking force developed by the specified cylinder pressure of 50 lb. may be determined by the rule given in the preceding paragraph, thus:

$$\text{Total braking force on car} = \frac{\text{(percentage of braking power)}}{100} \times \text{total weight}$$

$$\text{Total braking force on car} = \frac{60}{100} \times 46{,}000 = 27{,}600 \text{ lb.}$$

whence, by referring to the definition of percentage of braking power,

$$\text{Per cent of braking power on loaded car} = 100 \times \frac{\text{total braking force on specified wheels}}{\text{total weight on specified wheels}}$$

$$\text{Per cent of braking power on loaded car} = 100 \times \frac{27{,}600}{138{,}000}$$
$$= 20 \text{ per cent (based on 50-lb. cylinder pressure)}$$

Although the method outlined in the preceding paragraphs is perfectly general, a much shorter method for obtaining the same results may be stated as follows:

When the percentage of braking power, developed by a certain cylinder pressure, is known for a car of given weight, to find the percentage of braking power obtained on the same car under similar conditions, but with a new specified total weight, multiply the known percentage by the given original weight and divide this product by the new specified total weight.

This rule may be expressed in the following concise mathematical form:

$$\text{Per cent of braking power with new total weight} = \frac{\text{(per cent of braking power with original weight)} \times \text{original weight}}{\text{new total weight}}$$

To illustrate the use of this simplified rule, let it be required to solve the example given in the preceding paragraph by its aid. The necessary data are as follows: Original weight (of empty car) = 46,000 lb., new total weight (of car and load) = 138,000 lb., and percentage of braking power obtained with original weight (and 50-lb. cylinder pressure) = 60 per cent. The rule may now be applied thus:

$$\text{Per cent of braking power with new total weight} = \frac{60 \times 46{,}000}{138{,}000} = 20 \text{ per cent (based on 50-lb. cylinder pressure)}$$

By referring to any of the braking power or leverage examples given in the foregoing, it will be readily seen that if, in each of the cases considered, the brake cylinder pressure had been doubled, the force with which each shoe was pressed against its wheel would also have been doubled, or that, if the brake cylinder pressure had been reduced to half of its given value, the force with which each shoe was pressed against its wheel would also have been reduced to one-half of its original value. In general it is true, therefore, that the shoe pressure varies in direct proportion to the brake cylinder pressure and consequently that the percentage of braking power also varies in direct proportion to the brake cylinder pressure. Now when computing braking force and percentage of braking power it is often necessary to find the value of these quantities corresponding to various degrees of cylinder pressure, the following rule will, therefore, be found of much practical value in such cases.

If a known degree of braking force, or percentage of braking power, is developed by a given brake cylinder pressure, the value which either of these quantities will have, when a new specified brake cylinder pressure is employed as a basis, may be found by dividing the given braking force, or percentage of braking power, by the original cylinder pressure on which it is based and then multiplying the quotient thus obtained by the new cylinder pressure on which the required braking force, or percentage of braking power, is to be based.

This rule may be concisely stated in the following mathematical form:

$$\text{Total braking force based on new cylinder pressure} = \frac{\text{(original total braking force)}}{\text{(original cylinder pressure)}} \times \text{(new cylinder pressure)}$$

$$\text{Per cent of braking power based on new cylinder pressure} = \frac{\text{(original per cent of braking power)}}{\text{(original cylinder pressure)}} \times \text{(new cylinder pressure)}$$

To illustrate this method let it be required to find the (specific) percentages of braking power and total braking forces for the drivers and trailers of the Atlantic type of locomotive considered in the former examples connected with Fig. 5, when the brake cylinder pressure is 50 lb. per square inch, it having been previously shown, in the examples referred to, that with 60-lb. cylinder pressure, the total braking force on the trailers is 20,192 lb. and on the drivers 70,656 lb., while the percentage of braking power obtained on the trailers is 72.1 per cent and on the drivers 90 per cent.

By noting that the "new cylinder pressure" is 50 lb. and the original cylinder pressure is 60 lb. in this case and applying the rule the desired results may readily be obtained as follows:

For trailers: Per cent of braking power based on 50-lb. cylinder pressure $= \frac{72.1}{60} \times 50 = 60.1$ per cent

For drivers: Per cent of braking power based on 50-lb. cylinder pressure $= \frac{90}{60} \times 50 = 75$ per cent.

For trailers: Total braking force based on 50-lb. cylinder pressure $= \frac{20{,}192}{60} \times 50 = 16{,}827$ lb.

For drivers: Total braking force based on 50-lb. cylinder pressure $= \frac{70{,}656}{60} \times 50 = 58{,}880$ lb.

One-Man Rear-Exit Cars

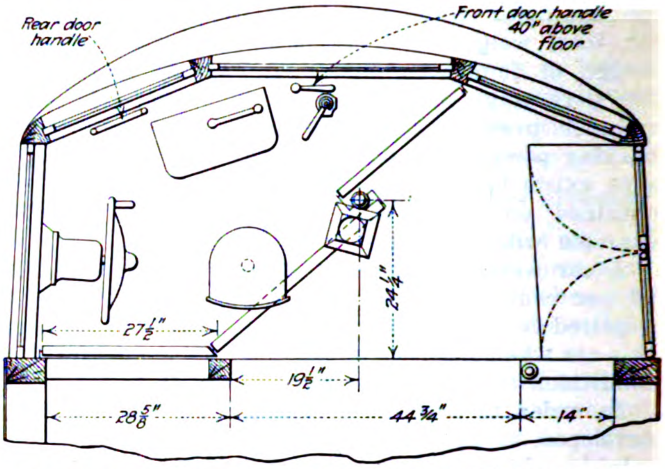
Seattle Has Arranged Twenty-seven Large Two-Man Cars for One-Man Operation in Unique Way—The Seating Capacity Sixty—The Operators Have No Difficulty in Handling Them

UNDER municipal operation, Seattle has extended one-man operation from safety cars to large double-truck two-man cars. This plan of operating some of the larger cars has been adopted with only slight changes in the arrangement of the cars, costing about $100 per car. These changes included permanently closing the rear entrance-door and connecting the rear exit-door in such a manner that the operator at the forward end has control of it. This was accomplished by running a rod the entire length of the car just under the left-hand sill and making proper connections with the door levers underneath the car step. The motorman's cab on the left-hand side of the front platform was removed, and the sand box formerly located therein was moved inside the car and placed under a seat. The bulkhead door at the front end was widened to 44 in., as shown in the accompanying drawing, which also shows the arrangement of fare box, curtains, etc. The controller, operator's seat and air valves were relocated as seen and air sanders, rear-door operating mechanism and a geared-wheel type of hand brake installed at the left of the operator.

In general, the plan embodied the changing of the single-end, rear-entrance and rear and front-exit two-man car into a front-entrance, rear-exit, single-end, one-man car. The following details and accompanying photographs will serve to indicate the type of equipment which has been converted for one-man operation:

Length over all	49 ft.
Width	8 ft. 7 in.
Length of body	38 ft. 6 in.
Truck centers	29 ft.
Seating capacity	60
Motors, 2 Westinghouse, 310-C	
Weight	40,360 lb.

Commenting on this scheme, D. W. Henderson, general superintendent of railways for the city of Seattle, said: "We converted twenty-seven cars of this type for one-man operation and they have been running since March 1, 1921. The trainmen are very well pleased with the car and we have had no complaints whatever from the public."



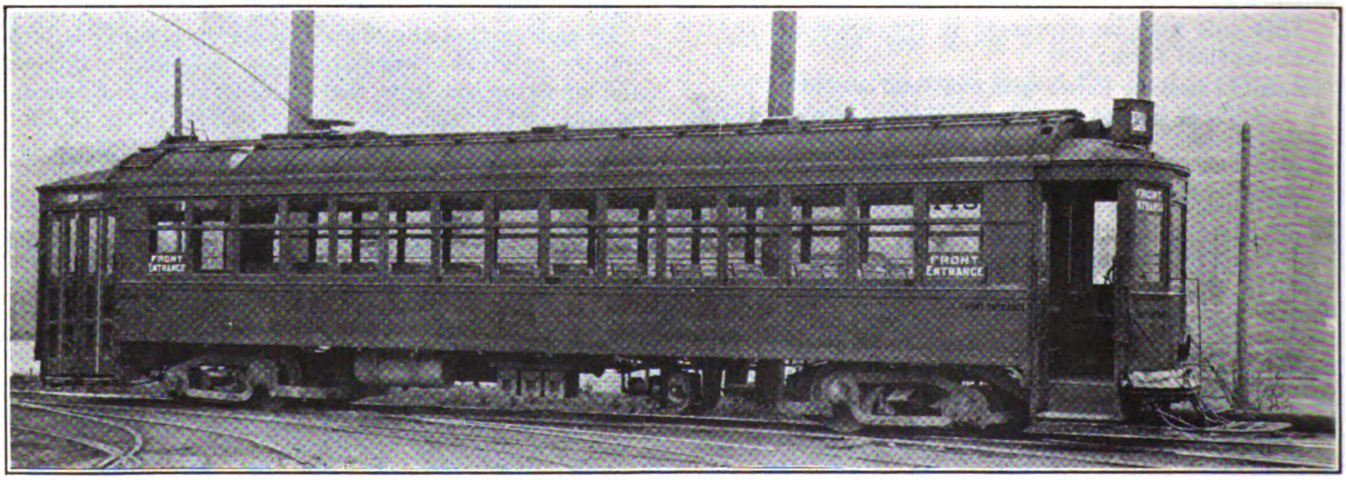
LOCATION AND ARRANGEMENT OF EQUIPMENT ON FRONT PLATFORM OF CONVERTED ONE-MAN CAR

These large one-man cars have been in use on the "Ballard-North" and "Sixth Avenue, N. W.," lines during the last sixty days and for rush-hour as well as off-peak service. The former line handles about 177,000 passengers per month and the latter about 120,000, which gives some idea of the density of traffic. The average speed called for in the time-table was 8 m.p.h. in January, 9.06 m.p.h. in February and 8.93 m.p.h. in March. A few of these cars have also been operated on other lines where they were interspaced with two-man cars and they are reported to have given very satisfactory service.

Reclosing Circuit Breaker Gives Ideal Service

ON ONE of the lines in Cincinnati power distribution was found last summer to be rather weak. An analysis of the situation pointed out that what was really needed was a one-unit substation out on this line. It happened that the line ran near a carhouse and a 500-kw., 60-cycle rotary was placed in a room in a corner of the carhouse and equipped with an automatic reclosing circuit breaker which is manufactured by the Automatic Reclosing Circuit Breaker Company of Columbus, Ohio.

One of the carhouse men starts this rotary at 5 o'clock in the morning, sees that it is in good condition and leaves it for the rest of the day. This unit has been in service for about eight months now and has given continued satisfaction and perfect operation during the whole time.



DOUBLE-TRUCK SEATTLE CAR CONVERTED FOR FRONT-ENTRANCE, REAR-EXIT, ONE-MAN OPERATION

Destructive Effect of Current on Ball Bearings of Electric Cars

Tests Made Under Various Conditions Show that Very Rapid Destruction of Ball Bearings Results from the Electric Current Which Flows Through Them—Types of Construction Are Suggested for Overcoming the Trouble and Testing Apparatus Is Described for Reproducing Conditions as They Occur in Service

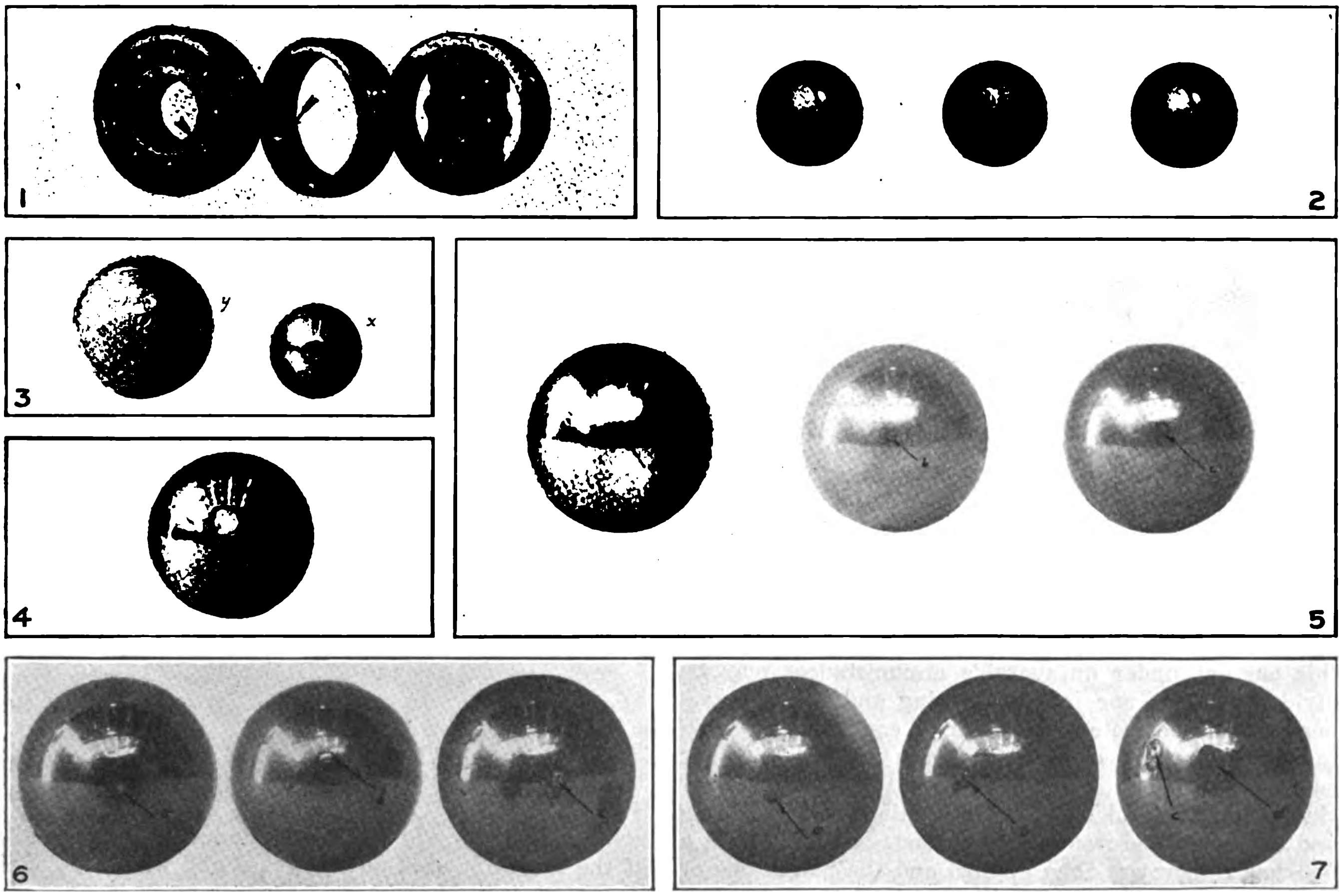
BY HILDING ANGSTROM
Chief Assistant Malmo Tramways, Sweden

DURING the past ten years various kinds of ball and roller bearings have been developed for use on electric railway cars and their equipment, both in America and in Europe. All of the bearings necessary for the operation of electric cars are subjected to very severe service caused by the movement of the cars on curves and at switches, by the forces developed when the brakes are applied and through the blows at rail joints. None of the anti-friction bearings developed has performed in the manner expected. In some cases the ball or roller retainer has been too weak. Sometimes the bearings have become "shelled" and destroyed due to the severe pounding action to which they are subjected. In some cases strength has been obtained at the expense of bearing friction.

Some of the bearings which have been tried in service in Europe are:

1. Svenska Kullagerfabriken, Gothenburg, Sweden.
   (a) Spherical ball bearings, two per housing.
   (b) Ball bearings with the outer ring turned cylindrical and radial bearings, one per housing.
   (c) Radial bearings, two per housing.
   (d) Spherical roller bearings, one per housing.
2. Nordiska Kullager Aktiebolaget, Gothenburg, Sweden.
   (a) Radial bearings, two per housing.
   (b) Disk bearings, two per housing.
3. Deutsche Waffenfabriks radial bearings in service on the tramways in Copenhagen, Denmark.
4. Jaeger-Bund-Rollenlager in service on the tramways in Dresden, Germany.
5. S. R. O. double-row radial bearings, Oerlikon, Switzerland, in service on the tramways in Berne and Zurich, Switzerland.
6. Delmez radial bearings, Brussels, Belgium.

In America several of the bearings mentioned above have been tried in actual service, and in addition experiments have been made with several types of American bearings.



EFFECT ON BALLS PRODUCED BY RUPTURING CURRENT PASSING THROUGH THEM

Fig. 1—Balls and retainers destroyed by action of current.
Fig. 2—Appearance of balls when removed from retainer.
Fig. 3—Shelling effect produced by arcing.
Fig. 4—Rupturing effect produced by current of 260 amp.
Fig. 5—Balls after being tested with permanent steady load at varying current.
Fig. 6—Effect on balls produced by rupturing current in air.
Fig. 7—Effect on balls produced by rupturing current in oil.

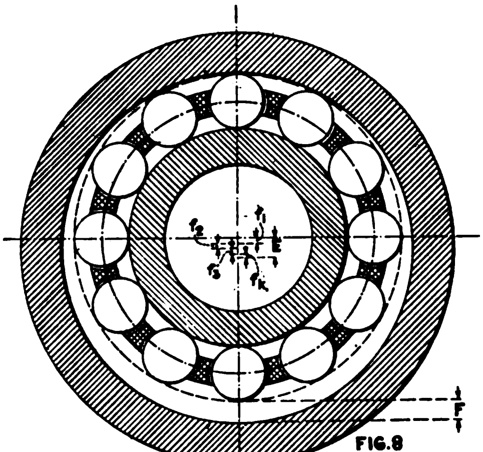
When lightweight safety cars came into use, with higher scheduled speeds and increased rates of acceleration, the value of decreased friction to reduce the load placed on the motors while starting was considered an essential advantage. Tests have been made by the General Electric Company and the Union Actien-Gesellschaft among others to ascertain the destroying influence of current on friction bearings. From these tests it appears that a current as low as 1 amp. per square inch corrodes the housings and that a much smaller current will damage the bearing metal.

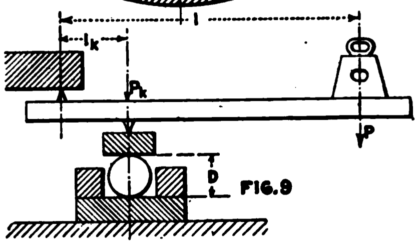
With ball bearings there is no insulating oil, as is the case with friction-type bearings, but there is an almost metallic contact.

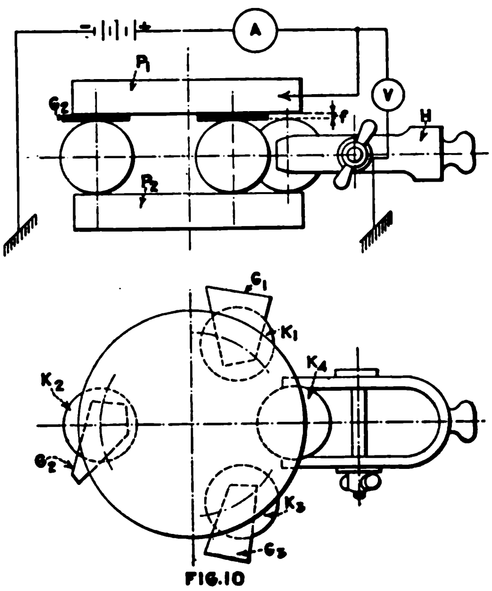
DISTRIBUTION OF CURRENT IN BEARINGS

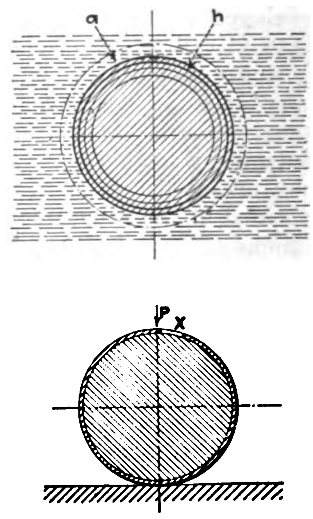
With the usual type of single-truck car the current passes from the trolley wheel through the controller and motors directly to the truck. The various motor bearings and the gearing are thus in the path of the current to ground. It may happen that in braking, where sand is applied, but one wheel may be in contact with the rail. In this case the current is divided between the axle bearings for one motor, the gearing and one journal bearing.

Assuming that the maximum circuit-breaker setting for a single-truck car is 225 amp., it is possible that this current under unfavorable circumstances may be divided between one journal bearing and the two axle bearings of the motor. In order to confirm this dividing of the current experiments were made with a car equipped with ball bearings. Three of the wheels of this car were insulated from the rails by mica sheets and but one wheel was left in contact. Current from a 550-volt trolley was then applied and the magnitude of the current was regulated through a water rheostat. The value of this current and the voltage drop were read between the ground side of the motors and the rail. This test was repeated with the brake connections insulated and with the motor lifted up from its suspension, so that the current could pass only through the axle bearings and the journal bearings.









DIAGRAMS OF BALL BEARINGS AND APPARATUS USED FOR TESTING

Fig. 8—At left (top), diagram of wear on ball bearings.
Fig. 9—At left (bottom), arrangement for determining relation between pressure and contact resistance.
Fig. 10—Center, apparatus used for reproducing arcing from vibration.
Fig. 11—At right, hard layers and craters formed by current.

If we indicate the intermediate resistance of the two axle bearings by r_g and let r_k represent that for the journal bearings, we have

$$\frac{1}{R} = \frac{1}{r_g} + \frac{1}{r_k}$$

where R is the total resistance. In actual operation this value for the contact resistance is not quite correct, as the current passing through the ball bearings is in reality not a direct current but one of an alternating variety, with a frequency varying with the speed of the car. This frequency may be represented by

$$v = N \frac{D_m - d}{2 D_m}$$

where v is the frequency, N is the rotative speed of the axle, d is the diameter of the ball, and D_m equals $D_i + d$ if D_i is the diameter of the inner ring. In this calculation, however, no consideration is given to the inductive resistance.

Results of this test showed that the resistance in a ball-bearing journal is about twice as great as the resistance in the two axle bearings of the motor. Of course, the ball-bearing resistance will be decreased by greater load and will vary with the amount and quality of the lubricant used on the gears and with the condition of the axle bearings as regards wear.

TABLE I—TEST RESULTS ON BALLS WITHOUT LUBRICANT

Exp.	Amp.	Volt. Max.	Watt. Max.
a	35	2.4	84
b	80	3.1	248
c	150	13.0	1,950
d	225	11.0	2,475

In the following I shall show that it is not the permanent current load, but the effect of rupturing this current on the balls that produces the welding action.

Tests were made of the magnitude of the maximum rupturing effect. Results of these show that the rupturing effect is sometimes under unfavorable circumstances as much as 7 kw. and this is certainly sufficient to destroy ball bearings.

HOW RUPTURING EFFECT IS PRODUCED

When the balls and the inner and outer rings of the bearing are worn, and the upper balls are pressed together and the inner and outer rings compressed, it is possible that the journal bearing under unfavorable circumstances may be insulated from the bearing box. Such a condition is indicated in Fig. 8, which shows how this play between the balls and the inner and outer rings occurs. If we let f_1 represent the diametrical wear in millimeters of the outer ring, f_2 the diametrical wear in millimeters for the inner ring, f_3 the sum of the diametrical wear in millimeters of the two balls, and f_k the pressing together and the compressing of the upper ball, then

$$E = f_1 + f_2 + f_3 + f_k$$

The play due to the loading and unloading of the bearings and which causes the rupturing effect is evidently $E - f_k$, and practical examinations have shown that this may amount to 0.3 mm. (11.8 mils).

Figs. 1, 2 and 3 show some balls and bearings which have been thus destroyed. In Fig. 1 the balls are still in their retainer. The dark stains on the balls were formerly considered as having been caused by acid in the lubricant or from shelling through fatigue. In Figs. 2 and 3 the balls are shown after removal from their retainer. The shelling effect is quite evident in Fig. 3x. The concentric shelling shown in Fig. 3y was probably due to the formation of a small crater.

Additional experiments have shown that the current distribution among the balls depends to a large extent on the load placed on the balls and that it is the rupturing effect and not the permanent current due to metallic contact that has the most damaging influence on the durability of the balls.

An arrangement for determining the relation between contact resistance and load is shown in Fig. 9. A ball with a diameter of 36.5 mm. (1.44 in.) is placed between two plane disks, the upper loaded through the lever, as shown. The total length of this lever indicated by l is 1,598 mm. (5 ft. 2.96 in.) and l_k is 348 mm. (13.71 in.). This arrangement does not give the same contact resistance as would be obtained by the balls between their inner and outer rings in the ball bearings, but the relative proportion from different loads should be about the same. Fig. 5 shows the effect produced on balls by the current.

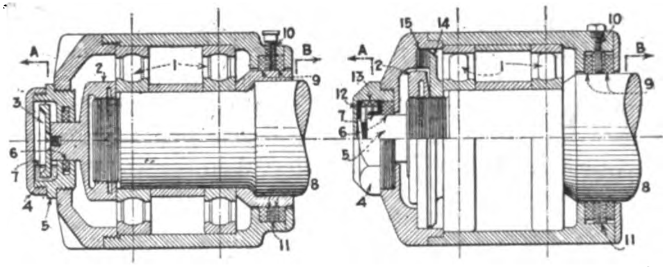
TABLE II—TEST RESULTS ON BALLS WITH LUBRICANT

Exp.	Amp.	Volt. Max.	Watt. Max.
a	27	1.8	48.6
b	60	3.8	228.0
c	90	3.2	288.0

In order to produce in an artificial manner the current breaking which is supposed to take place in ball bearings, the apparatus shown in Fig. 10 was used. Between two plane disks P_1 and P_2 were placed three balls K_1, K_2 and K_3, each having a diameter of 36.5 mm. (1.44 in.). Three mica disks, G_1, G_2 and G_3, were placed between the upper plane disks and the balls. The thickness of the mica disks was measured very accurately. A fourth ball, K_4, was then inserted and to this was screwed a vise H. The diameter of this ball, K_4, was the same as the other balls. The average value for the thickness of the three mica disks should be the distance between the ball K_4 and the plane disk P_1. By measurement this was found to be 0.29 mm. Direct current was then applied to the upper disk P_1, its value being measured by an ammeter A and the drop in potential between the upper disk and the ball K_4 was measured by a voltmeter V.

The ground for the circuit was connected to the vise H and by the raising first of the ball K_4 to make contact with the disk P_1 and then by the lowering of this ball into contact with the disk P_2 an arc was established while readings of current and voltage were taken. Tests were made with four different strengths of current and the balls were changed after every reading. The voltage drop obtained and the maximum wattage is shown in Table I. Figs. 4 and 6 show the effect produced on the balls.

Other balls were then greased freely and the experiment was repeated. It was found that the rupturing effect was increased, but that it was more difficult to maintain the arc on account of the oil breaking it. Fig. 7 shows the effect on the balls in this latter test, and it will be noted that the size of the welded crater is reduced somewhat through the use of lubricant. The voltage and wattage obtained is shown by Table II.



JOURNAL BOXES FITTED WITH AUXILIARY CONTACTS FOR CARRYING CURRENT

Fig. 12—At left, double nut arrangement.
Fig. 13—At right, additional pressure provided by spring.

To illustrate the destroying effect that should be obtained on a ball bearing with a great load applied, let us consider the two balls shown in Fig. 11. The ball shown at the top of Fig. 11 has a hard layer *h*, which is thicker and more permanent when formed in oil than in water, due to the inferior ability of the oil to conduct heat. The surface layer of the ball as shown at the bottom of Fig. 11 has been pierced by the formation of a crater at *z*. The effect of the formation of such a crater is to subject the ball to a shearing or bending stress when a heavy load is applied instead of a compressive stress as would be obtained with a perfect ball.

To prevent damage to the balls through the passage of electric current some form of shunting device should be applied. The insulation of the outer ring of the ball bearing is possible, but does not appear advisable, as the repeated blows and shocks to which ball bearings are subjected would probably rupture or at least compress the insulating material, which would then produce additional stresses in the ball bearings. Tests have shown that the transmission of current through lubricated ball bearings may establish a galvanic element through the acids which the oil or lubricant may contain.

A shunt or auxiliary contact arrangement should be placed outside the ball or roller bearing casing and should have such a low resistance that it will practically exclude all transmission of current through the balls or the rollers. The contact arrangement should also be constructed so that it will be easy to inspect.

A journal box fitted with N. K. A. disk bearings is shown in Fig. 13. This type of bearing has rollers which are self-centering, so that they tend to adjust their axis of rotation parallel to the axle of the wheel. The right-hand sides of the bearings shown in Figs. 12 and 13, which are marked *B*, show a current transmission arrangement that can be applied to new bearing boxes. This arrangement consists of two brass rings which bear against the collar of the wheel axle. These brass rings also serve to support the felt rings 9, against which they are pressed by means of a spring. To provide a better contact and a path of less resistance for the current, the space between the brass rings is filled with graphite or mercury. The conducting power of graphite is about 10^{14} times as great as that of oil, and it is thus evident that the use of graphite facilitates the transmission of current to a high degree. This type of box provides a path of low resistance for the current and at the same time gives a very tight construction against the entrance of sand or dust from the outside. The left-hand ends of Figs. 12 and 13 marked *A* show a contact nut arrangement which can be applied to old ball or roller bearing boxes. In general this type of construction corresponds to that just described. In Fig. 12A the current passes through the double nut at 4 and 5 to the graphite or mercury layer 7 and then to the contact disks 3, contact pin 2, and then to the axle of the wheel. In Fig. 13A the nut arrangement is simplified somewhat and the tightening ring has been made more effective by the use of a spring bearing on a brass contact disk 7. The path of the current in this construction is through the contact nut 4, the contact spring 12 and the contact disk 7 to the contact pin 5 and then to the axle of the wheel. These types of construction have been patented and are now in use on the tramways of Malmo, Sweden.

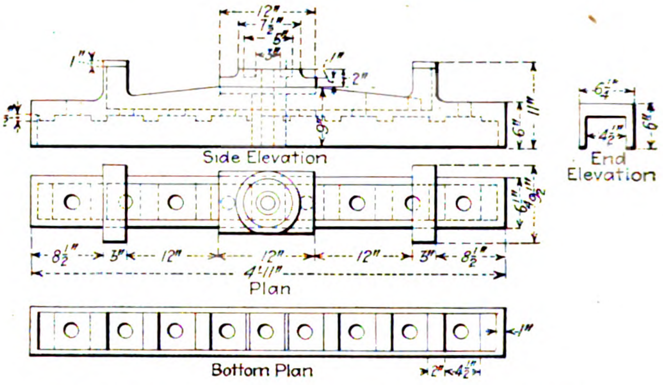
Make Bolster Trucks from Side-Bearing Types

Old Side-Bearing Brill Maximum Traction Trucks Converted Into Bolster Type by the Georgia Railway & Power Company in Atlanta—Specially Designed Bolster Developed

THE Georgia Railway and Power Company, Atlanta, has several open cars which have been used only in intermittent service and they have been inclosing some of these open cars to put into regular daily service rather than extra service. These cars are equipped with Brill Eureka Maximum Traction Truck No. 22, side-bearing type, and the company did not consider this old style truck suitable for continuous service. Rather than to buy new trucks, it tackled the problem of changing these trucks to bolster type, with completely satisfactory results. Some of these trucks have been in daily service practically two years and have developed no trouble. Eight or twelve more of these trucks will be changed over to the bolster type during the coming year.

In the change-over the company used only the former side bars, journal boxes, wheels, axles and springs of the old trucks, using the same motors, too, of course. It was naturally necessary to equip the trucks with newly designed brake rigging throughout and also to equip them with bolster, transom angles and with spring planks.

The bolster with which these trucks are equipped is a specially designed cast iron bolster, made in the foundry of the company in Atlanta. The accompanying drawing indicates the design and dimensions of this bolster, which is so constructed that the company was able to use the four coiled springs which were previously provided in the original truck to carry the car body. These springs are 7 in. long and have six turns of $1\frac{3}{16}$-in. wire. The diameter of the coil at the top is $4\frac{1}{4}$ in. and at the bottom 5 in.

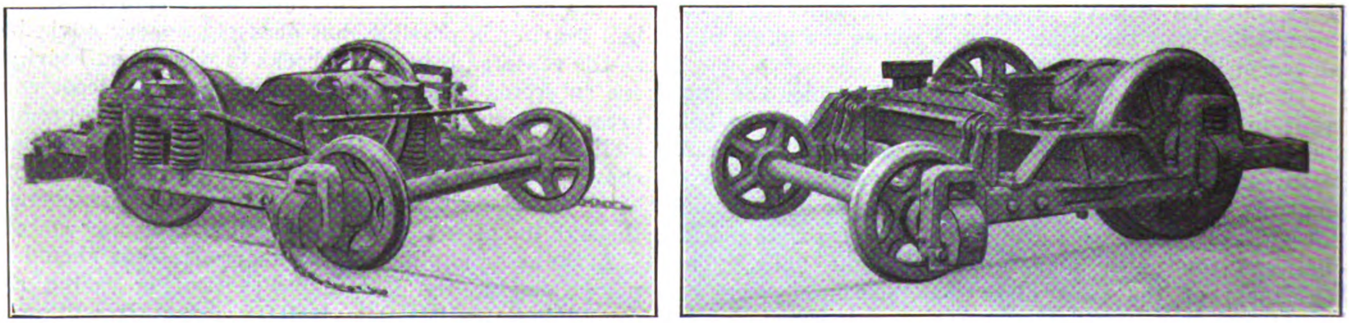


SPECIAL BOLSTER FOR REMODELED TRUCK

The bolster centers are 25 in. from the center of the small wheel axles and 23 in. from the center of the large wheel axles. Twenty-inch and 33-in. wheels are used. In the remodeled truck the motors are outside hung with nose suspension. The motors themselves are Westinghouse No. 68, with a gear ratio of 14 to 68.

The car bodies are some that were built by the company some twenty years ago. As remodeled, the total weight of the body, truck and equipment is 24,500 lb. There is seating capacity for forty passengers. The control on these cars is Westinghouse PK.

The total cost of remodeling these trucks has proved to be about $300 per truck.

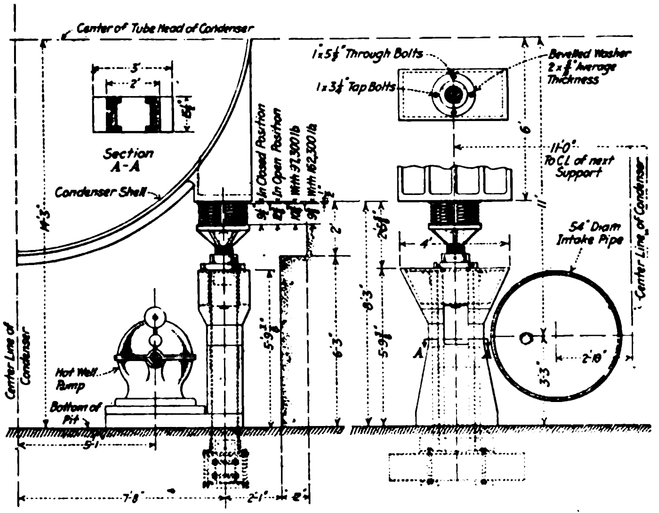


AT LEFT, OLD SIDE-BEARING TRUCK. AT RIGHT, REMODELED TRUCK AS BOLSTER TYPE

Data of New Interborough Turbine

Water Rate of 11 Lb. per Kilowatt-Hour for 30,000-Kw. Turbine Shown by H. B. Reynolds, Research Engineer Interborough Rapid Transit Company, to Have Been Attained in Test—Facts Contained in A. S. M. E. Paper

IN A paper scheduled for presentation at the spring meeting of the American Society of Mechanical Engineers, to be held in Chicago, May 23 to 26, 1921, Herbert B. Reynolds, research engineer Interborough Rapid Transit Company, New York City, gives information regarding the several types of turbine which have been installed by that company during the past dozen years. He also includes the results of tests on the latest unit installed, namely, the three of 30,000-kw. capacity, the installation of which was completed during the past year.



DETAILS OF THE SPRING SUPPORTS FOR THE CONDENSER

Mr. Reynolds said that in order to provide additional power capacity for the new subways constructed in New York City during the period from 1913 to 1921, and operated by the Interborough Rapid Transit Company, additional turbine units were installed in both the Fifty-ninth Street and Seventy-fourth Street power stations. He reminded his readers that the original engine-room equipment of the Fifty-ninth Street power plant consisted of nine 7,500-kw. maximum capacity Manhattan-type Allis-Chalmers double-angle compound engine units and three Westinghouse 1,250-kw. turbines, the latter driving 60-cycle generators which supplied current for subway lighting. Later 25-cycle current was adopted for this lighting, the current being taken from the main units. During 1909 and 1910 five low-pressure 7,500-kw. maximum capacity General Electric turbine units were added, taking exhaust steam from five of the engines at atmospheric pressure.

Two of the new 30,000-kw units in the Fifty-ninth Street plant were installed in the space formerly occupied by the three lighting units, while the third turbine was installed at the western end of the station. The concentration of power possible with modern turbines is strikingly shown by the space they require as compared with that for reciprocating engines. The maximum capacity of the engines visible in the background in the photographs reproduced is but 26,250 kw., while that of the turbine in the foreground is 35,000 kw.

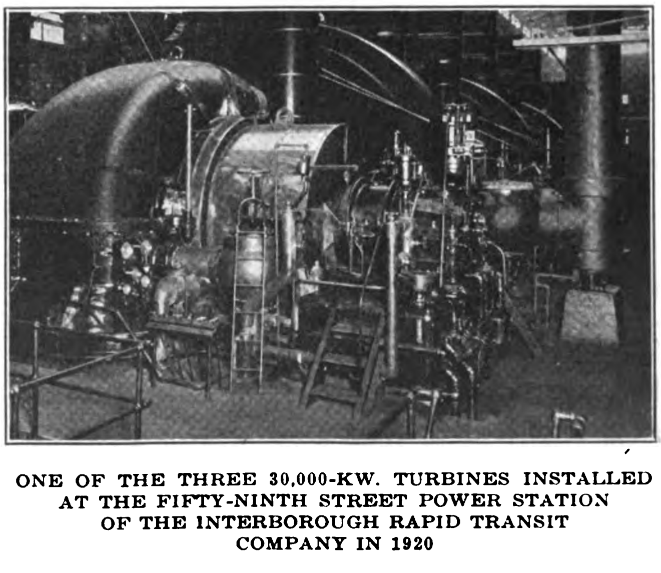
The three 30,000-kw. Westinghouse cross-compound turbines which were completed in 1915 were among the new units installed at the Seventy-fourth Street power station.

In the paper Mr. Reynolds gave structural and design details of the new turbines. Among other things, he said that they are of the straight Curtis impulse type, having twenty pressure stages, each consisting of one velocity stage. The normal steam pressure at the throttle is 225 lb. per square inch, abs., with a superheat of 150 deg. F., exhausting into a vacuum of 29 in. referred to a 30-in. barometer at 58.1 deg. F. The speed is 1,500 r.p.m.

In addition to the primary steam inlet, a secondary valve is provided which opens after the load reaches 24,000 kw. and which enables the turbine to carry a load of 35,000 kw. As all auxiliaries in the station are steam driven, a connection has been provided in the turbine through which any excess auxiliary exhaust steam may be injected. This is at the sixteenth stage of the turbine.

The generators are three-phase, star-connected, generating 25-cycle current at 11,000 volts. The excitation is at 250 volts. The generators are cooled by circulation of air maintained by a fan which forms an integral part of the generator. The air is drawn from the turbine-room basement and discharged from the top of the generator into the turbine room through a short stack.

Each unit comprises one single-shell two-pass Worthington condenser, two Worthington centrifugal circulating pumps, each driven through reduction gears by Kerr turbines; two Worthington centrifugal condensate pumps, each driven by a General Electric turbine, and one Laidlaw-Dunn-Gordon dry vacuum pump. Each condenser contains 50,000 sq.ft. of tube surface in

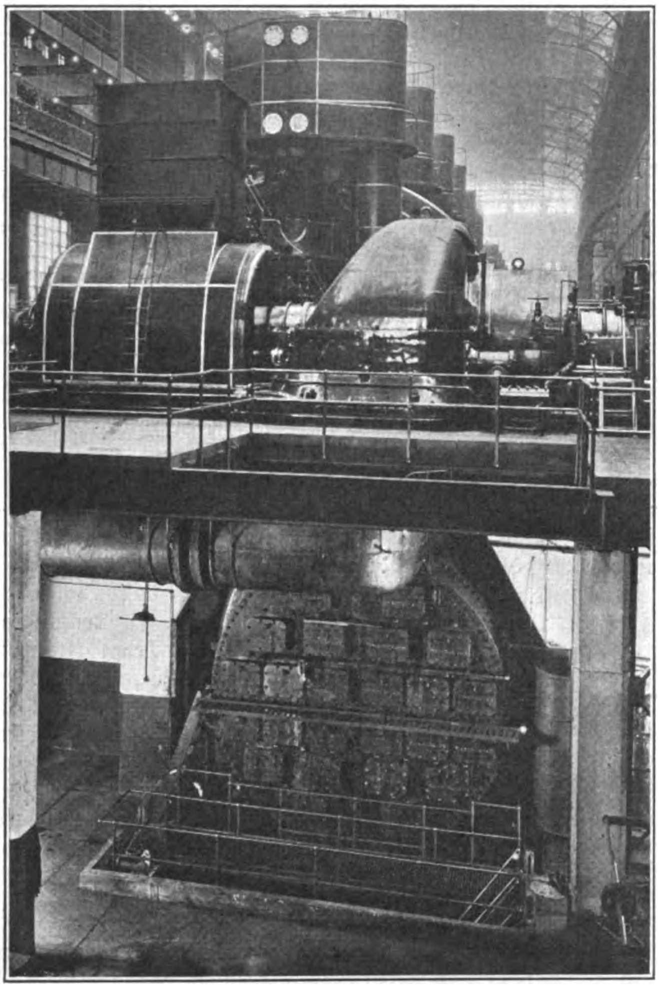


ONE OF THE THREE 30,000-KW. TURBINES INSTALLED AT THE FIFTY-NINTH STREET POWER STATION OF THE INTERBOROUGH RAPID TRANSIT COMPANY IN 1920

10,760 tubes 18 ft. long, 1 in. in outside diameter and of No. 18 B. W. G. thickness. The condenser is of the two-pass type, the water entering at the bottom and passing out at the top. As the condensers are mounted on springs, rubber expansion joints are inserted in the circulating water lines.

ADJUSTMENT OF SPRING CONDENSER SUPPORTS

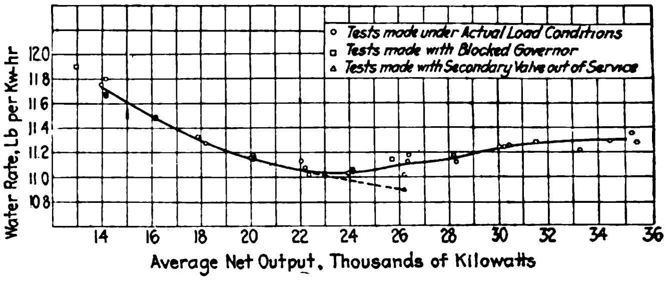
As no expansion joint was provided between the turbine and the condenser, it was necessary to mount the latter on springs, so as to provide for expansion and contraction. The spring supports are shown in one of the illustrations. To facilitate the setting of the springs and provide a means for detecting and adjusting for fatigue in them, hydraulic jacks were incorporated in the condenser supports.



A COMPLETE TURBINE AND CONDENSER UNIT

Mr. Reynolds gave some detail of the procedure followed in setting these springs. He said that after the erection of the condenser and circulating water pipe had been completed, with the exception of making the joint between the condenser and the turbine, the condenser was raised while empty by means of the jacks, leaving ⅜ in. clearance between the face of the turbine outlet and the face of the condenser inlet. The load on each of the four supports was then determined by noting the oil pressure in the jacks. It was decided that with the condenser empty and cold the downward pull on the turbine should not be less than approximately 17 tons. The distance that the joint between turbine and condenser would have to be pulled in order to give this load was estimated from the modulus of elasticity of the turbine and condenser metal. The condenser was then raised to within the predetermined distance of the turbine outlet, which was found to be 0.231 in., after which the lock nuts on the jacks were screwed home and the condenser bolted to the turbine. The load on the springs was then determined with the condenser still empty by noting the pressure required just to raise the lock nuts. Every few months the load carried by the springs will be determined in this manner and compared with the load which existed when the condenser was first bolted to the turbine. Any fatigue which may develop in the spring will be compensated by screwing the lock nuts down.

It was found that the minimum condenser load carried by the turbine with the condenser shell empty was approximately 17 tons. As the water required to fill the condenser weighs about 60 tons the load on the turbine increases to 77 tons when the circulating water pumps are started. This is reduced to about 70 tons due to the compression of the springs under the expansion of the condenser during warming up. Immediately after shutting down, and while the condenser is still warm but drained, the load on the turbine is reduced to 10 tons. Thus, the condenser load on the turbine varies from 10 to 77 tons, out of a total condenser weight varying from 180 to 240 tons.



WATER-RATE CURVE FOR NEW INTERBOROUGH RAPID TRANSIT TURBINE

Dotted line shows results that would probably have been obtained if steady-load tests had been conducted within this range of load where the secondary valve is continually opening and closing.

TESTS SHOWED HIGH THERMAL AND MECHANICAL EFFICIENCY

The equipment used for conducting the turbine tests consisted of two large water-weighing scales for measuring steam consumption, three single-phase rotating standard watt-hour meters for measuring the output, and the necessary thermometers, gages and mercury columns for determining temperatures, pressures and vacua. Most of the tests were of three-hour duration and, with the exception of a few special tests, the turbine was operated under conditions normal as to the type of load.

The results of the tests, in so far as the water rate is concerned, are given in the accompanying curve. The lowest rate obtained while operating under normal conditions was 11.03 lb. per kilowatt-hour. The thermal efficiency, or ratio of the output to the energy in the steam, was 25 per cent. The Rankine efficiency; that is, the ratio of the energy developed to that available within the working range of temperature and pressure, was 75.5 per cent.

In the paper the results of various auxiliary tests were also given, but it is impossible to summarize these within the space limitations of the present abstract.

Railway Valuation in Connecticut—I*

Procedure in Assigning Values to "Inside Plant" Property of a $50,000,000 Railway System

By ARCHER E. KNOWLTON
Instructor in Electrical Engineering, Yale University

IN THE VALUATION of railway property so much time and expense have been involved in most cases that a study of methods which will reduce these items to a minimum is worth while. In presenting this story of the valuation of the property of the Connecticut Company by the Public Utilities Commission of Connecticut, Mr. Knowlton, who serves as the electrical engineer to the commission, points out the philosophy of the commission and its engineers in their efforts to arrive at a fair valuation in moderate time, and at moderate expense. In this installment Mr. Knowlton shows the problem as a whole and tells how the "inside plant" and overheads were treated. In a subsequent installment he will develop the interesting unit-of-construction or "yardstick" bases of valuation for outside plant, which was the largest factor in saving both time and expense.

—EDITORS.

THE regulation of public utility rates has in most contested cases called for such evidence of physical value of the utility property as appeared to be obtainable only through detailed inventory and valuation. This demand for valuations has come from all three of the parties to regulation, the public, the public utilities and the public utilities commissions. Occasionally sworn statements of utility executives or of disinterested experts have been acceptable, but once a valuation is demanded for rate purposes usually nothing short of minutely detailed inventory and appraisal suffices. Adherence on the part of the commissions, with their quasi-judicial status, to the rules of evidence as laid down by the courts has been a large factor in requiring these elaborate valuations. This, in a measure, has been excusable, considering the ever-present possibility of appeal to the courts from the commissions' decisions.

There is ample basis, however, for questioning the necessity of incurring the expense of making a minutely detailed valuation, and the trend seems to be toward recognition of these negating factors and even in some quarters to concede that proximate methods may result in adequate accuracy. Some of the aspects of recent physical valuations open to criticism are the cost, the length of time to complete, the element of estimate in fixing depreciation and other tangible overhead percentages, the uncertainty as to labor costs in connection with the multiplicity of small items, frequently the inflexibility of the summary as to rational apportionment of the total value among subsequent subdivisions of the property and, more frequently, the insignificance of sizable variations in the physical total as reflected in the rates for the service rendered.

The costs of valuations can hardly be called exorbitant when one observes that for a selection of the recent cases resulting in totals of eight and nine figures the services of the appraisers amounted to from 1.3 per cent to 6.6 per cent of the yearly return (at 6 per cent) on the fair value found. It may be urged that such a small item is negligible among the other constituents of the total needed receipts upon which the rate is fixed, but the same reasoning sanctions the employment of a proximate method of valuation the cost of which is only a fraction of that of a detailed appraisal. It is, however, the public, in its consuming, investing or taxpaying character, which pays the bill, and while only recently laws have gone into effect specifying in great detail how values shall be arrived at, there is evident today a tendency to attach less importance to the strictly physical valuation and more to such factors as the value of the service, or even the mere prevention of an operating deficit.

The time taken to make a physical valuation has often been the cause of long delays in rendering decisions on rate changes, and by the time they are reported conditions in the industry may have undergone abrupt changes, especially during and since the war. Any procedure which will facilitate early decisions is therefore much to be desired.

And again, in actual service the life of a rail bond is not wholly independent of that of the rail nor that of a cross-arm independent of the life of a pole. This feature, in conjunction with the mixture of past experience and future conjecture that establishes the depreciation percentage for each element of property, leads to totals which involve more uncertainty than is ordinarily attributed to a detailed valuation. Another element of uncertainty appears in the labor allowances in connection with the many small items, because, while individually small in themselves, in the aggregate they may result in considerable variations in the total. Incidentally, can any one know to as high a degree of precision the actual labor cost of installing a single trolley bracket as he can the cost of constructing a thousand-foot section of uniform completed bracket construction on wood poles?

Although the tendency has been to regard only the value of the entire connected systems in fixing rates, it is often desirable to be able to demonstrate that local rates are not unreasonable when viewed in the light of the fair value of the corresponding subdivision of the property. Unless precautions are taken the summary of a detailed valuation may not permit ready determination of the physical value for such a subdivision.

And, finally, considerable variations in the physical and fair values are usually possible without in themselves determining the rate. As an illustration, take a million-dollar railway which has an operating revenue of $370,000 and operating expenses of $300,000, with resulting net operating revenue of $70,000. If operating expenses increase one-third, the operating revenues must rise to $470,000 to provide the same net revenue as before. But if the fare originally was 5 cents, under the new conditions 6 cents will not suffice and 7 cents will be necessary. In order that the fair value in itself should be the determining factor for either the 6- or 7-cent fare under the new conditions, the valuation total would have to be as low as $635,000 or as high as $1,685,000 as against the $1,000,000 assumed. Of course these computations imply an undiminished traffic and the application of all net revenue toward interest on capital, but they indicate the extent of variations that are tolerable in the actual case.

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*In two parts.

PURPOSE AND BASIS OF THE VALUATION

The Connecticut General Assembly of 1919 directed the Public Utilities Commission to "investigate the conditions under which the street railways of the state are operated and to report . . . such recommendations and suggestions with respect to legislation as it may deem proper and advisable in order to place such street railways upon a safe and efficient operating basis." But if the Legislature contemplated a valuation it must have been guided by some of the considerations advanced above in favor of an inexpensive tion it must have been guided by some of the commission in following the mandate deemed "it necessary to procure as accurate a valuation of the properties as possible," but added, "we are of the opinion that a reasonably accurate business-like valuation can be made with our existing force and facilities, supplemented by temporary assistance at moderate expense." In this manner the three engineers of the commission, E. I. Rudd, J. P. Wadhams and A. E. Knowlton, were directed to ascertain the cost of reproducing the 750 miles of street railway system under price conditions prevailing from 1910 to 1915. Likewise, the auditor and statistician, Edward Field, was directed to ascertain the actual investment or original cost to date of all the properties.

It was therefore not only imperative but also in keeping with the philosophy of the commission that the engineers, in ascertaining the reproduction cost of the railways, should devise a method which would entail a minimum of time and expense. At the outset it was recognized that if a detailed inventory were demanded it would be the extended portions of the property that would involve the greatest number of men and consequently the most time and expense. It was in the field work that most of the time and expense could be saved. Familiarity with the properties prompted the idea of treating as much as possible of the "way and structures" account by *applying computed costs of unit sections of an appropriate number of types of outside plant construction.* Some $19,000,000 worth of railway property was valued by this procedure, the portions to which it was applied comprising the following (the numbers are those of the I. C. C. classification):

505-7, 510.	Track and roadway construction.
511.	Paving.
519-521.	Electric line construction, poles and fixtures.
521.	Feeder and distribution system.
544.	Transmission system.
518.	Telephones.
517.	Signals.
507.	Bonding.

Not only was economy in time and expense attained by this procedure, but it is believed that the results present advantages not always obtainable from the usual type of detailed valuation. The procedure, in a word, amounted to the establishment of "yardsticks" by means of which to measure the assembled construction as contrasted with a detailed count of elementary units without regard to their assembly. Some of the details of the procedure may interest the railway public and a technical discussion of this method will appear in a subsequent article.

CONNECTICUT COMPANY'S OWNED AND LEASED PROPERTY

	Way and Structures	Appraised Value	
501	Engineering and superintendence	$1,556,182.23	
502	Right of way	722,753.55	
	Work done outside company area	397,200.00	
503	Other land used in electric railway operations	1,485,845.61	
	Land for parks and resorts	605,598.30	
504	Grading	2,071,605.97	
505	Ballast	9,858,741.18	
506	Ties		
507	Rails, rail fastenings and joints		
510	Track and roadway labor		
508	Special work	1,408,709.00	
	Electric switches	16,417.50	
511	Paving	3,696,073.84	
512	Roadway machinery and tools	93,252.69	
515	Bridges, trestles and ulverts	1,285,138.25	
516	Crossings, fences and signs	156,173.30	
517	Signals and interlocking apparatus	86,723.06	
518	Telephone and telegraph lines	41,820.28	
519	Poles and fixtures	3,803,717.85	
521	Distribution system		
520	Underground conduits	210,956.18	
522	General office buildings	2,035,084.87	
523	Shops and carhouses		
524	Stations, miscellaneous buildings and structures	143,240.00	
525	Wharves and docks	35,911.00	
526	Park and resort buildings	297,369.56	
	Total way and structures		$30,009,014.22
	Equipment		
530	Passenger and combination cars	4,780,800.00	
531	Freight, mail and express cars	207,533.00	
532	Service equipment	330,230.00	
533	Electric equipment of cars	3,051,329.00	
534	Locomotives	25,000.00	
536	Shop equipment	267,687.75	
537	Furniture	99,233.51	
538	Miscellaneous equipment	62,347.86	
	Total equipment		8,824,161.12
	Power		
539	Power plant buildings	686,820.00	
540	Substation buildings	67,908.00	
541	Dams, canals and pipe lines	90,000.00	
542	Power plant equipment	3,654,000.00	
543	Substation equipment	481,328.00	
544	Transmission system	281,463.41	
	Total power		5,261,519.41
	General and Miscellaneous		
546	Law expenditures	263,676.26	
548	Insurance (injuries and damages)	158,347.88	
547	Interest one year	2,781,297.56	
549	Taxes		
550	Promotion and organization	982,725.12	
	Contingencies	1,838,240.20	
	Working capital	500,000.00	
	General stores and supplies	1,298,744.51	
	Total general and miscellaneous		7,823,031.53
	Grand total		$51,917,726.28
	Land, buildings and equipment not used for electric railway purposes		378,864.52

CONNECTICUT COMPANY'S OWNED AND LEASED PROPERTY

Approved Value by Divisions

Division	Total Computed Single Track, Miles	Total Appraised Value	Average Value per Mile
Stamford	22.571	$991,169.04	$43,913.39
Norwalk	24.144	1,259,463.42	52,164.65
Bridgeport	105.183	7,735,827.44	73,546.37
Derby	27.493	2,025,821.82	73,685.00
New Haven	150.987	12,269,957.62	81,265.00
Meriden	37.981	1,765,165.44	46,474.96
Waterbury	85.063	5 125 073.91	60,250.33
New Britain	33.485	2,050,356.80	61,232.10
Hartford	167.185	10,816,982.33	64,700.67
Middletown	20.470	988,025.09	48 266.98
Torrington	12.676	542,642.21	42,808.63
New London	89.920	4,548,496.65	50,583.82
Working capital, general stores and supplies	....	1,798,744.51	....
All divisions	777.158	$51,917,726.28	$66,804.60

Above figures include under New Haven Division 7.426 miles of West Shore Railway Company property and under Hartford Division 0.814 miles of Manchester Electric Company's trolley property.

PROCEDURE IN VALUATION OF ACCOUNTS TO WHICH UNIT-OF-CONSTRUCTION BASIS WAS NOT APPLICABLE

A map of the Connecticut Company's system, the principal one in the state, is shown herewith, and the total physical values for the various portions of the property are shown in the accompanying table, arranged according to the Interstate Commerce Commission account numbers. Those accounts which were dealt with on a unit-of-construction basis have already been listed and there is given below a brief description of the means and method of assigning values to the remaining accounts.

501. *Engineering and Superintendence.*—The value allowed for this expenditure was obtained by taking 5 per cent of accounts 504-526, 539, 541, 544, 550a, 550b (largely way and structures items excepting land) and, in addition, 1 per cent of accounts 502, 503, 530-538, 542, 543, 550d, 550e (principally land and equipment items).

502. *Right of Way.*—For sections adjacent to railroad right-of-way, New York, New Haven & Hartford Railroad figures per acre as supplied to the Interstate Commerce Commission in its railroad valuation were used. Normal values based on the price paid by a willing buyer to a willing seller were multiplied by a factor, which varied from 1 to 5, to cover severance, damages and other costs of acquisition. Other parcels were valued in part by reference to company records and in part by field estimates of commission engineers or real estate men.

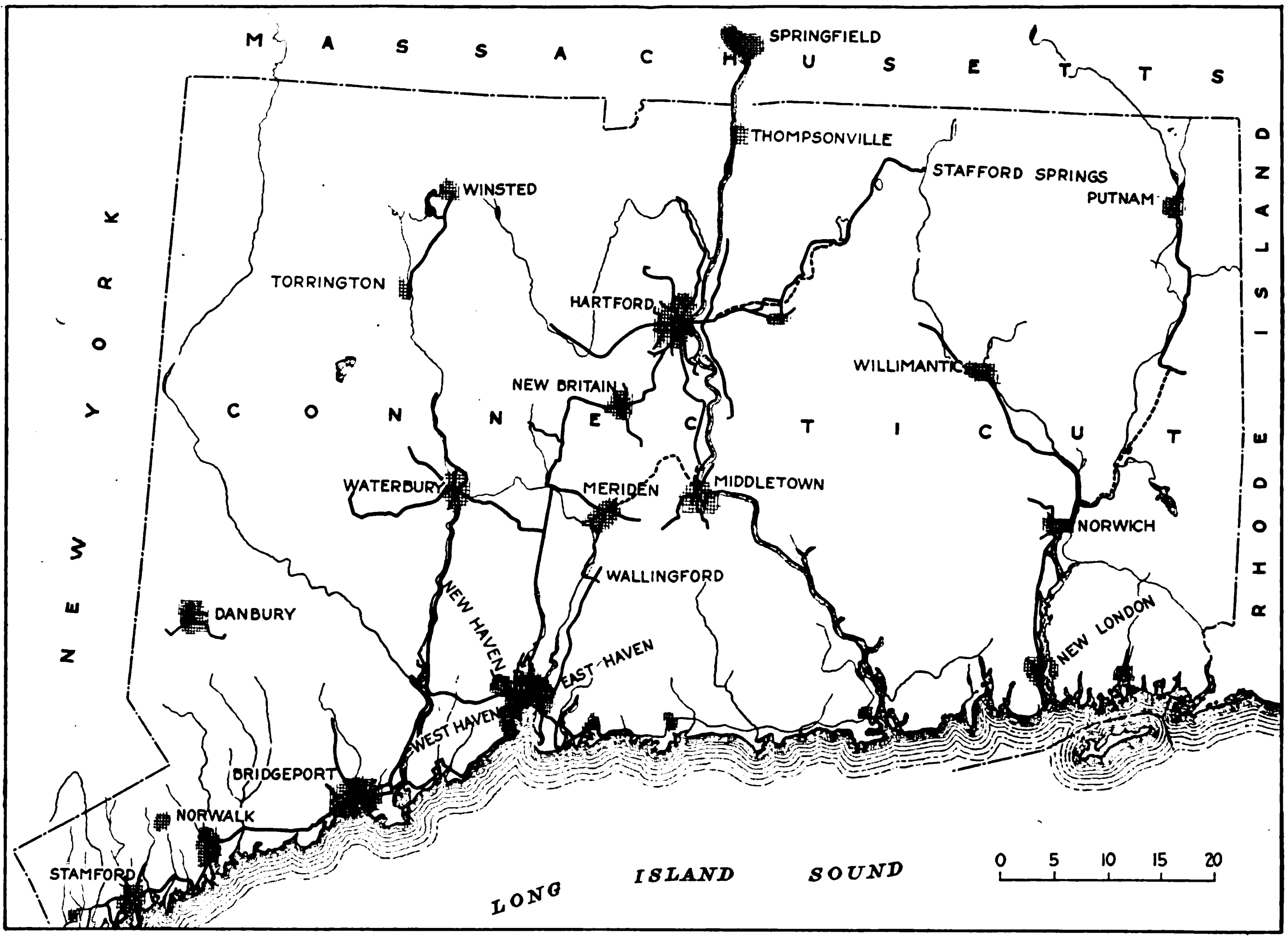
503. *Park and Resort Lands, Etc.*—The judgment of real estate dealers, tax collectors and valuation records of the New York, New Haven & Hartford Railroad were relied upon for this account (1 per cent of the total).

504. *Grading.*—In order to check the information appearing on the company's records and maps and to supply missing data a few of the interurban lines were cross-sectioned by commission engineers accompanied by company engineers.

508. *Special Trackwork.*—Detailed plans of each installation were available and the costs were computed directly from these plans.

512, 516, 536-538. *Tools, Equipment, Furniture, Etc.*—These accounts comprise roadway machinery and tools; crossings, fences and signs; shop equipment; furniture; miscellaneous equipment. The company supplied the inventory and prices were assigned by commission engineers. These items combined amount to only 0.2 per cent of the physical total for the entire property.

515. *Bridges, Trestles and Culverts.*—Appraised estimates made by outside engineers for the company on the occasion of a regular maintenance survey were supplied by the company to the commission. A field check made by commission engineers at the time of the grading survey indicated a few corrections and additions.



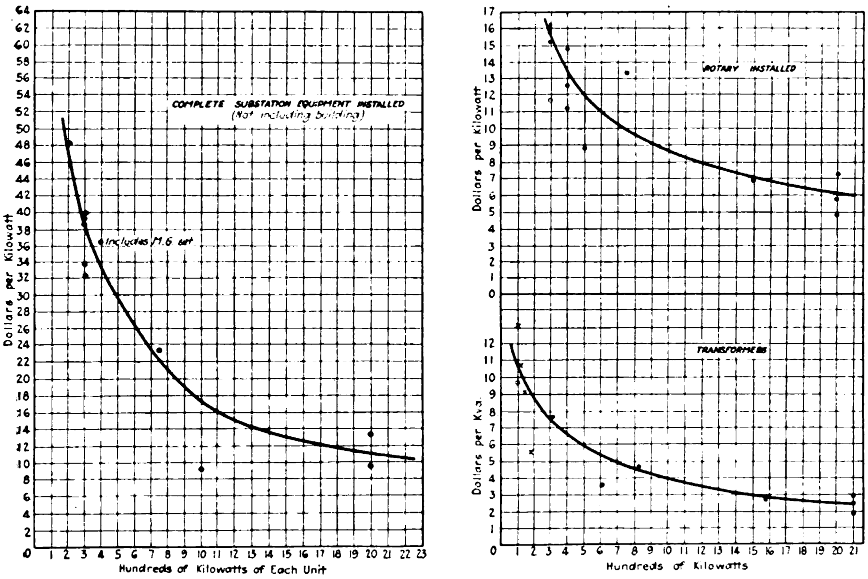
MAP SHOWING CONNECTICUT COMPANY SYSTEM, WHOSE VALUATION IS DESCRIBED IN THIS AND SUBSEQUENT ARTICLES

522-526, 539-541. *Buildings and Various Other Structures.*—There are included here general office buildings; shops and carhouses; stations, miscellaneous buildings and structures; park and resort buildings; power and substation buildings; wharves and docks. The company had a record of each of these items covering size and character of construction. With a view to classification each of these structures was visited to ascertain its physical condition and the manner of use. The prices applied were on a cubic content and area basis similar to those employed by the I. C. C.

530-534. *Rolling Stock.*—Cars (passenger, combination, freight, mail, express, and service) with their electric equipment, and locomotives were examined to determine the type of body, of trucks and of electric equipment. Unit prices were then applied separately to each of these three components of each car. Cars manifestly in need of extensive repairs to permit shifting from part-time to full-time service were averaged at 80 per cent of reproduction value. No value was included for abandoned equipment.

542, 543. *Power and Substation Equipment.*—Lists of all the equipment were supplied by the company and these in conjunction with personal inspection enabled two consulting engineers, one electrical and one mechanical, both of wide experience in the field of steam-electric power, to report over-all values for the equipment in each plant. The commission felt that the candid opinion of these engineers on the lump reproduction value of the plants would be as valuable and reliable as would be the summarized result of a more detailed study unit by unit. Due to relatively recent construction, it was found easily possible to ascertain the equipment costs for the substation in considerable detail. The variation in installed cost of substation equipment per kilovolt-ampere with the capacity of the substation is exhibited in the accompanying curves as an interesting result of this study.

546. *Law Expenditures.* One per cent of the total amount of accounts 504-526-539, 541 and 544 was allowed for this item. It will be noticed that this includes all physical items except land, rolling stock, furniture and equipment of power plants and substations.



CURVES SHOWING SUBSTATION COSTS AS RELATED TO CAPACITY

547, 549. *Interest and Taxes.*—In carrying out the instructions of the commission to ascertain the reproduction cost based on prices prevailing during the period 1910-1915, the engineers estimated that the system would be established in five approximately equal sections, each requiring one year to construct. On this basis an allowance was made for interest and taxes of 6 per cent for one year on accounts 501-546, 548, 550a-550e.

548. *Insurance* (Injuries and Damages).—Employers' and public liability insurance premiums (based on payroll) amount to the following percentages of the total of each account when applied to the probable labor component of that account and these were then allowed for the insurance item:

2.4 per cent of (517-521, 544).
0.3 per cent of (530-534).
0.7 per cent of (536-538, 542, 543).

550. *Promotion and Organization.*—Two per cent of accounts 501-549, 500a-550e was the allowance for this capitalized expenditure. General stores and supplies as inventoried by the company and priced jointly by the company and commission engineers amounted to some 2.5 per cent of the physical total.

Analysis will show that the total of the tangible overhead allowances amounts to 22.2 per cent of the total of physical items appearing in accounts 502-544. If general stores and supplies and working capital are deducted the remaining overhead items represent about 18.2 per cent of the physical total.

HISTORICAL COST

The statistician and auditor made a very careful study of the corporate and accounting history of the company and arrived at the totals in the table below.

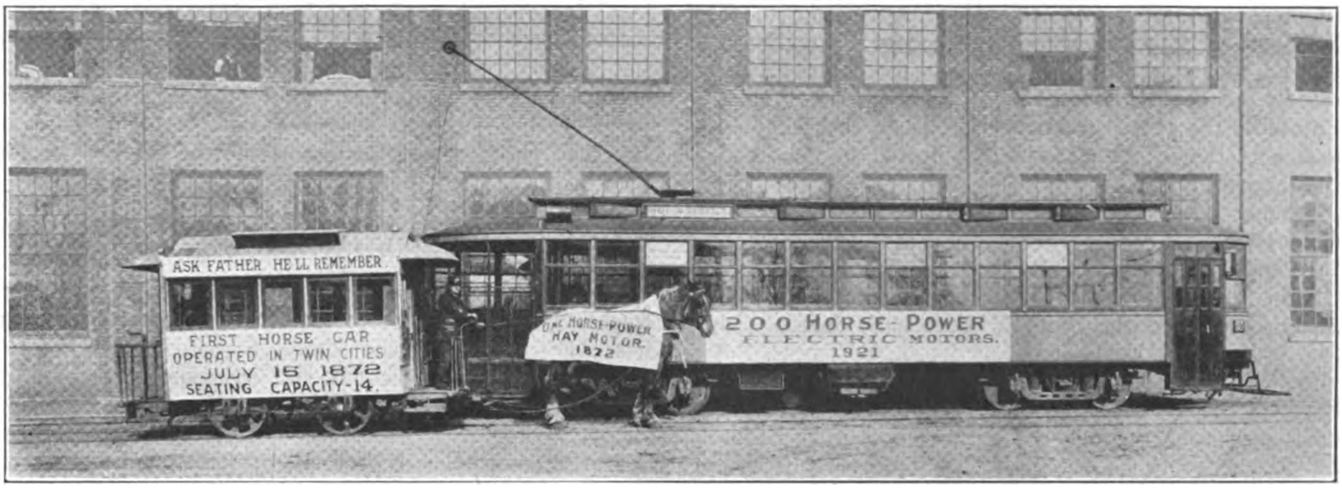
A corresponding total of $19,741,537.14 was found to be the historical cost of the lines leased by the company, making the total historical cost of the company's owned and leased lines $60,753,352.85.

Much of the difference of $9,000,000 between the reproduction cost and historical cost is accounted for when it is recollected that many of the component lines started as horse railways, and the capital invested in horses, rolling stock, light rails and roadbed construction, none of which is in existence today, is included in those costs, as well as the cost of the modern tracks, pavement and equipment, built and paid for with new and additional capital.

The foregoing shows in a general way the sources of and the bases for the values assigned to that portion of a street railway property which, for contrast, may be called "inside plant." While no claim is made that all the figures are rigidly exact, it is felt that they surely are entitled to be classed as proximate in their character rather than merely approximate. Or from another angle, such errors, omissions or duplications as may have crept in in this instance, as is nearly always the case, were well within the limits imposed at the start and, in the opinion of the writer based on the arguments advanced, are tolerable in all ordinary utility valuations. A later article will exhibit in considerable detail the method of attack for the "outside plant."

FINAL TABLE SHOWING HISTORICAL COST OF THE PROPERTY OF THE CONNECTICUT COMPANY

Expenditures for road and equipment on owned lines (8/1/1906 to 12/31/1919)	$16,032,996.00
Expenditures for road and equipment on leased lines (1906–1919)	5,159,503.61
Total expenditures on owned lines and leased lines	$21,192,499.61
Cost of construction and equipment of the several street railway lines purchased by predecessors of the present company, as shown by the last report of such street railway companies to the Railroad Commissioners	19,819,316.10
Total historical cost of street railway properties of the Connecticut Company, at Dec. 31, 1919	$41,011,815.71


ASK FATHER HE'LL REMEMBER
FIRST HORSE CAR OPERATED IN TWIN CITIES JULY 16 1872 SEATING CAPACITY-14
ONE HORSE-POWER HAY MOTOR 1872
200 HORSE-POWER ELECTRIC MOTORS 1921

TWO FEATURES IN TWIN CITY'S DEMONSTRATION

Railways Find Real Publicity Pays

Demonstrations on National Electric Railway Day Catch Public Eye for Unusual Sights —Editorial Nose for News that's Different—Makes Folks in the Industry Realize the Importance of Their Jobs—Interest of Public Further Aroused by Competition for Prizes for Essays and Free Passes

THE electric railway industry on May 4—National Electric Railway Day—proved itself the "Babe Ruth" of the public utility league. It knocked the advertising and publicity ball far out over the clubhouse. May 4 was proclaimed National Electric Railway Day by the committee on publicity of the American Electric Railway Association and notices to this effect were sent out to the membership on April 16 over the signature of P. H. Gadsden, president.

> It was well to give a public demonstration of the anniversary of the trolley, for it brought vividly to public mind the great advance that has been made in transportation. People are prone to live intensely in the present and to forget or to ignore progress that has been achieved.
>
> —*Washington* (*D.C.*) *Star*

The celebration was without doubt a success. In virtually every city in the United States where an electric car is run the increased efficiency of local transportation service and the great importance of local electric railway systems were driven home to the public. This was accomplished by parades showing the contrast between either the horse cars of a third of a century ago or the earlier types of trolley cars and present up-to-date $15,000 cars, newspaper stories, display advertising and other publicity.

Reports received by the Advertising Section of the association, which suggested details of the program to companies under the direction of the publicity committee, indicate that more than a score of companies staged some form of demonstration in different parts of the country.

Practically every daily newspaper in the country carried either a local or a telegraph story about national observance of the day. These stories not only told the history of the electric railways but also discussed the present problems of the industry. Two press associations put out national stories to 2,000 daily newspapers which were prepared on facts furnished them by the Advertising Section. Local companies co-operating with their home papers supplied further information that led to a large number of feature stories of community importance. Clippings so far received by the association show that the stories ranged from 300 words to a page and a half. Most of them were liberally illustrated with pictures of former and present types of cars. Many newspapers also commented editorially on the observance of the day and the growth and importance of electric railways to the welfare and development of urban centers.

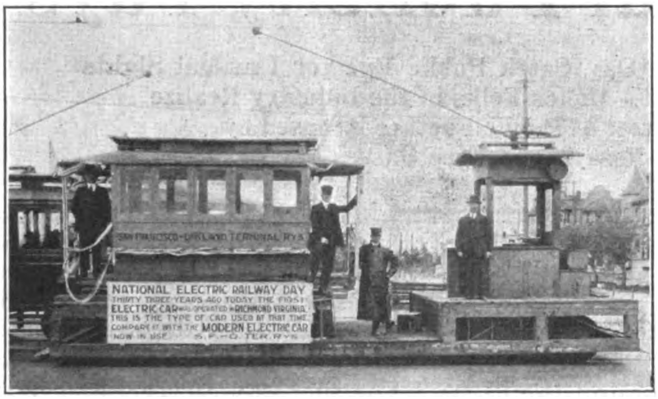
The largest news motion picture organizations of the country took motion pictures of several of the celebrations. Advices from A. H. Herrmann, Virginia Railway & Power Company, say that several motion picture operators were present at the Richmond celebration and took pictures of the parade despite the inclement weather. These pictures were shown later in motion picture houses throughout the country.

Many local companies supplemented the newspaper stories with display advertisements. The Northern Ohio Traction & Light Company and the Virginia Railway & Power Company issued special editions of their own publications, the latter being distributed broadcast to car riders. The Advertising Section also provided special cards for window display and other leaflets.

Three companies, namely, those operating in East St. Louis, Ill.; Charleston, S. C., and Pottsville, Pa., offered money prizes for the best essay or historical review of the development of the local system. In Pottsville the prize offer was limited to the school children and the interest taken is reflected in the illustration shown.

Among the companies that have reported street demonstrations are: Union Street Railway, New Bedford, Mass; Virginia Railway & Power Company, Richmond, Va.; Twin City Rapid Transit Company, Minneapolis and St. Paul, Minn.; Indianapolis (Ind.) Street Railway, Eastern Pennsylvania Railways, Pottsville, Pa.; Rockford (Ill.) & Interurban Railway and the San Francisco-Oakland (Cal.) Terminal Railways. Several companies, including New Orleans and St. Louis, have reported that they intend to stage demonstrations later.

Some difficulty was found in several places in resurrecting old rolling stock that would show the desired contrast between present and former day service and therefore such companies could not put on a parade, but contented themselves with display advertising and newspaper publicity.


SAN FRANCISCO-OAKLAND TERMINAL RYS
NATIONAL ELECTRIC RAILWAY DAY
THIRTY THREE YEARS AGO TODAY THE FIRST
ELECTRIC CAR WAS OPERATED IN RICHMOND VIRGINIA.
THIS IS THE TYPE OF CAR USED AT THAT TIME
COMPARE IT WITH THE MODERN ELECTRIC CAR
NOW IN USE S. F.-O. TER. RYS

ONE OF THE FEATURES SHOWN IN OAKLAND, CAL.

A letter from Mr. Herrmann regarding the Richmond celebration said in part:

"Despite the cold, rainy day we paraded three cars throughout the city in the afternoon, the front one being the oldest type summer car we could find; in fact, it was the only car of the kind we could secure, and it was quite antique looking, being the first summer car operated on the Richmond lines. The car was signed on the sides as you will note in the illustration and it carried a brass band. The next car was one of the big center-entrance type and then followed a modern safety car, these two carrying the Mayor, City Councilmen and officials of the company. The parade started from Twenty-ninth and P Streets, which was the terminal from which the first electric railway operated.

"Film representatives from Washington came down, arriving just a few minutes before the parade, and they got pictures from several sections of the city.

"Everything worked out very well and I do not believe we could have made a better demonstration if we had had a month's time. In fact, I believe the speed under which every one worked had a stimulating effect."

The celebration in Minneapolis and St. Paul attracted widespread attention, the newspapers giving it publicity prior to and on Electric Railway Day. In Minneapolis Henry Green, a former driver but now in the legal department, again took hold of the reins of the car. After a trip through the down-town section of the city the car was taken to St. Paul, and there John Prior, the oldest street car conductor, was the driver. The car was preceded by the trainmen's band in both cities. The fourteen persons making application to ride in the car were given seats of honor.

Contest Between Old-Timers Aroused Keen Interest in New Bedford, Mass.

New Bedford, Mass., had a tremendously successful celebration. Immediately after the celebration of the day was suggested, the Union Street Railway began preparations for the event and succeeded in arousing great interest. One of the most successful features of the program was the offer of a year's free transportation over the local lines to the oldest man who rode on the horse car during the parade. A heated contest between old residents ensued and the prize finally was won by Edwin B. Macy, 88 years old. The reins were handled by James Card, one of the oldest former employees of the company. Peter Duprey, another old driver, also was on the platform. A clipping from the New Bedford *Times* says that between ten and fifteen thousand persons witnessed the demonstration. Not only the New Bedford but also some of the Boston papers devoted liberal space to a review of the celebration.

The Pottsville, Pa., celebration also attracted much newspaper publicity. The Pottsville *Republican*, which in the early days led the fight for electric railways in that territory, devoted more than a page to the story. C. A. Hall, general manager Eastern Pennsylvania Railways, and his assistants worked energetically in bringing about a successful observance of the day and they were well repaid for their efforts. Unfortunately, it was impossible on account of rain to keep the old time car out as long as seemed desirable on May 4, so it was brought out again later in the week.

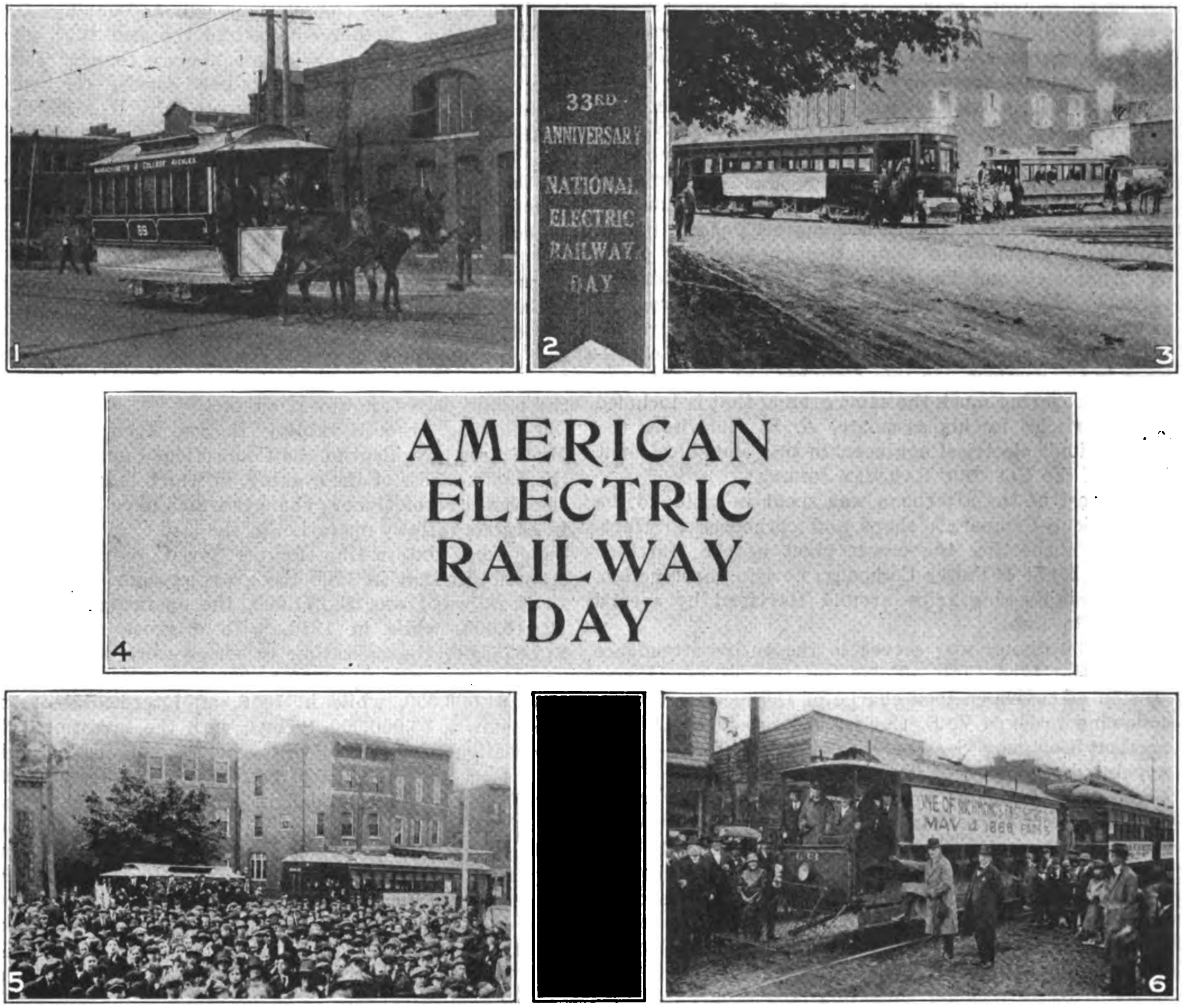
In Indianapolis Robert I. Todd, president Indianapolis Street Railway, quietly slipped one over on the folks by springing his show on the unsuspecting public at about 5 o'clock in the evening. An old-time horse car drawn by two mules followed by a modern electric car started from the Traction Terminal Station and ran through the principal streets of the town. In describing the trip Mary E. Bostwick, a staff writer of the Indianapolis *Star*, says that "all the traffic rules in the world were broken by the mules and that a cop almost arrested the party." Besides Mr. Todd, Joseph A. McGowan, secretary and treasurer of the company; James P. Tretton, superintendent; James F. Lynch, J. E. Sweeney and Edward Noon rode on the car.

In Rockford, Ill., Gus King, who drove a mule car in the olden days, was in charge of the resurrected hay-burner. For a brief half hour the mule enjoyed prominence, being the cynosure of all eyes on the principal streets. But, as is often the fate of heroes, he suffered a fall and in one short half hour after the demonstration he again was dragging a prosaic coal wagon through the back streets of the town.

The East St. Louis & Suburban Railway co-operated very successfully in the observance of the day. Exhibits received show that single and double-page advertisements calling attention to the day and its significance were carried in various local papers prior to and on the day of the celebration. Dashboard signs were also displayed on the cars May 3 and 4. Sleeve bands, as illustrated, were worn by officials, office employees and car crews on May 4. The advertisements were particularly well executed. One of them contained articles by prominent citizens regarding the growth of the local traction system. One striking feature of this same advertisement was the announcement of the "Funeral of the Dinkies" displayed within inverted rules, as well as interesting illustrations of old time and modern cars.

In Oakland, Cal., a single-truck car of early vintage was mounted on a flat car. The flat then toured the city and caused much comment on past means of transportation.

Advices have been received from companies showing that much attention was paid to the day by the newspapers and the public in more than 125 other cities. Among those more than a score need special mention, namely, Bangor, Me.; Charlotte, N. C.; Cincinnati, Ohio; Duluth, Minn.; Elmira, N. Y.; El Paso, Tex.; Evansville, Ind.; Framingham, Mass.; Green Bay, Wis.; Haverhill, Mass.; Jackson, Mich.; Little Rock, Ark.; Los Angeles, Cal.; Lynchburg, Va.; New Orleans, La.; Oil City, Pa.; Pine Bluff, Ark.; Peoria, Ill.; Savannah, Ga.; Seattle, Wash.; St. Joseph, Mo., and Sheridan, Wyo. In these places either well-illustrated special advertisements or signed staff stories or both were features.


1
33RD ANNIVERSARY NATIONAL ELECTRIC RAILWAY DAY
2
3
AMERICAN ELECTRIC RAILWAY DAY
4
5
MAY 4 1888
6

ALL SECTIONS OF THE COUNTRY PARTICIPATED IN THE CELEBRATION OF NATIONAL ELECTRIC RAILWAY DAY

1—President Todd of Indianapolis at the reins.
2—Badge worn by the employees of the Little Rock Railway & Light Company.
3—First and last types of cars at Pottsville, Pa.
4—Arm band worn by train crews, officials and office employees of the East St. Louis & Suburban Railway.
5—School children of Pottsville participating in demonstration.
6—Earliest type of cross-bench open car operated in Richmond.

The personnel of the publicity committee, under whose direction National Electric Railway Day was celebrated, is:

Barron G. Collier, New York, chairman; S. W. Huff, New York; B. I. Budd, Chicago; C. B. Buchanan, Richmond, Va.; W. A. Draper, Cincinnati; C. D. Emmons, Baltimore; L. S. Storrs, New Haven, and Horace Lowry, Minneapolis. The details of the program were carried out by Labert St. Clair, head of the association's advertising section.

The committee has great reason to be pleased with the results of the day. It demonstrated the possibilities of nationally advertising electric railways through the co-operation of local companies with the association's Advertising Section.

Large Meeting in Hartford

Joint Session of New England Street Railway Club and Connecticut Company Section No. 7, A. E. R. A., Proves Most Successful

PERFECT weather for the inspection and sightseeing trips added the finishing touch to the success of the joint meeting of the New England Street Railway Club and Connecticut Company Section No. 7, American Electric Railway Association, at Hartford on Wednesday, May 18. More than 250 members of the two organizations spent the day at Hartford and attended the sessions which started at noon and stopped at 10 o'clock at night. While suggestions for holding such a joint session have been made many times in the past, it was not realized until this week.

The meeting started with a luncheon at the Wethersfield carhouse of the Hartford Division of the Connecticut Company, which was followed by the showing of the moving picture reel taken at the New England Street Railway Club outing in Montreal last summer. After this E. Irvine Rudd, chief engineer of the Public Utilities Commission of Connecticut, presented a paper on "Appraisals and Their Uses." After discussing the various purposes of appraisals and showing the progress of engineering valuation, Mr. Rudd discussed the recent valuation which the commission has made of the railways in Connecticut. In this discussion he presented an analysis covering much the same ground that is included in the articles by his associate, A. E. Knowlton, the commission's electrical engineer, in this and subsequent issues of the ELECTRIC RAILWAY JOURNAL.

The rest of the afternoon was spent in visits to the Connecticut Company's shops and carhouses in Hartford, in inspecting the power plant of the Hartford Electric Light & Power Company, now in construction, and in sightseeing trips around Hartford by special car and by auto.

At 6:30 dinner was served to the entire attendance at the Hartford Club. Following this dinner a succession of chairmen took charge of the meeting, in the following order: V. S. Curtis, vice-president of Connecticut Company Section No. 7; N. J. Scott, newly appointed manager of the Hartford Division of the Connecticut Company; Edward Dana, president of the New England Street Railway Club, and W. J. Flickinger, vice-president for Connecticut of the New England Street Railway Club. During these successive chairmanships, resolutions were adopted on the death of Warren P. Bristol, late manager of the Hartford Division, and 66 new members were admitted to the New England Street Railway Club.

With Mr. Flickinger presiding, the program of the evening was then commenced. The principal speaker was Richard T. Higgins, chairman of the Public Utilities Commission of Connecticut, the keynote of whose address was to urge co-operation of the rank and file of street railway employees to their executives and to the company in providing good service to the public. Mr. Higgins said that originally it was electric railways themselves which sought franchises and thereby established themselves so that it was therefore up to the companies primarily to furnish service and overcome the obstacles of street railway operation. Their efforts, however, must be coupled with the co-operation of the public, but no amount of sympathy or co-operation by the public will overcome any lack of co-operation on the part of the company. Railway men, particularly executives, are public servants, but no amount of ability of executive officers is any good without the co-operation of the men. Any one voluntarily entering public utility service takes on the obligations of a public servant.

Mr. Higgins also pointed out that the Public Utilities Commissions are necessarily influenced, whether rightly or wrongly, by public opinion, and it is therefore of vital importance that it be by an enlightened public opinion. From this it is necessarily concluded that the company should make every effort to enlighten the public, for naturally the public wants to be fair, and if it has full information its opinions and therefore its influence on the commissions will be sound.

Mr. Higgins further emphasized the fact that what the public wanted is service much more than a reduction in fares. The public wants good service, for which it, in his belief, is willing to pay. Mr. Higgins also talked on the practical business-like valuation which Mr. Rudd had discussed in the afternoon, and also on the new problems of the Public Utilities Commission in Connecticut due to the placing of jitneys under its control in that state. He said that the Connecticut law now made it obligatory to determine if public convenience and necessity require jitney service, and, while this brought up many problems which he could not discuss and decide now, he did want to point out that the question of public convenience and necessity is very largely the result or function of the feelings of the public, based, however, on fact.

Following an entertaining Roscoe Arbuckle movie, Mr. Storrs, president of the Connecticut Company, gave the final address of the evening, in which he emphasized the almost revolutionary changes which have taken place in electric railway operation in the last four years. He gave some interesting figures for Connecticut, and pointed out that in 1900 the gross revenue of Connecticut railways was $3,271,000, the operating expenses $2,016,000, while in 1919, with a gross revenue of $12.875,000, the operating expenses were $11,200,000. This left a net in 1900 of $1,080,000 and in 1919 less than $1,000,000, while in 1916, an intermediate year, the net was $3,066,000. Thus, with the investment in Connecticut almost trebled, the net revenue has actually decreased, and while 1920 figures are not available in detail, he predicts a deficit for the state of about $1,000,000.

However, he pointed out that the railways have gone through four years of stress and strain to the advantage of all. New methods of doing everything have been evolved, and these years have also helped to encourage co-operation and to promote better ideas of railway publicity and information.

Lay Single Tracks Off Center

IN CONNECTION with some repaving being done by the city, the Chattanooga Railway & Light Company recently reconstructed some of the single-track lines in the city, and in doing so placed the single track where one of the two tracks would be in case it were a double-track section of line. This was done because it was felt that development in the near future might make it advisable to double track these sections of the system and that considerable expense would be saved if the one track which had to be laid now were placed so that it would form one of the double tracks in the future without the necessity of doing anything to it at the time the system or section was double-tracked.

Fares and Short-Haul Traffic

THROUGH an error in the printing office last week the concluding lines of an article appearing in that issue on "Fares and Short-Haul Traffic," by Edward A. Roberts, engineer with John A. Beeler, New York, was omitted. The greater part of this article appears on pages 896 and 897 of last week's issue. The concluding two paragraphs, including the omitted portions, are as follows:

"The placing of a definite value on the average car rider's time is not at all a simple task, and one person's estimate is about as good as another's. A person's earning ability should, however, not be confused with the amount of time the same person would feel justified in using in order to avoid spending 5 cents. The average figure of 50 cents an hour seems high, although it would apply to those who are actually being paid for their time by an employer or to those who are hurrying to specific engagements. Under this classification are such people as salesmen, bill collectors, business men and plumbers. The figure of 25 cents an hour fits more closely the estimate that the average person uses in deciding whether to ride or walk. The average woman who keeps house and shops during the middle of the day bases the worth of a street car ride on some such amount as this. The same applies to the vast majority of people going to and from work. It is doubtful if the leisure time of even the well-paid classes should be considered at more than 25 cents an hour.

"The method of analysis outlined in this article is not intended to point out a definite answer to the fare question or to say what fare will yield the most total revenue in a specific case, but it is believed that its use will in many instances shed additional light on some phases of one of the industry's most serious problems."

Discussion of the National Electrical Safety Code

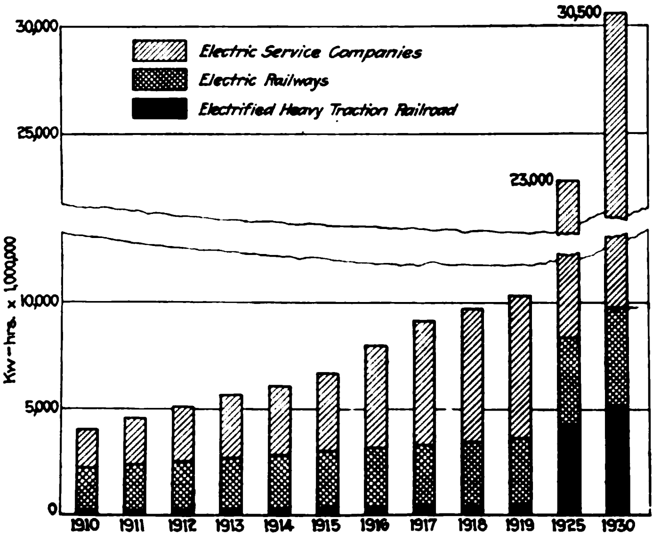
THE Bureau of Standards has just issued Handbook No. 4 on the National Electrical Safety Code, containing a revised discussion of the rules and forming a companion volume to Handbook No. 3, which contains the revised edition of the rules themselves. The discussion of the rules has been considerably amplified. Many items and suggestions have been included which are not involved in the rules themselves but have bearing upon good practice and matters immediately related to the subject of the rules. In addition, the endeavor has been made to make the meaning and interpretation of the rules entirely evident and to give in many cases the reasons which have prompted inclusion of particular rules in the Electrical Safety Code. Illustrations have been provided to show the intent and application of a number of rules.

The discussion of the rules follows the order of the rules themselves and is segregated into the four parts dealing respectively with stations and substations, overhead and underground lines, utilization apparatus, and operation of utility stations and lines. There is also a supplementary section dealing with the subject of grounding. The introduction to the discussion includes the results of a survey of pole lines made jointly with the committee on safety rules of the National Electric Light Association and conducted in the summer of 1919.

Meeting of the Superpower Committee

AT A MEETING in New York on May 13 of the Advisory Board of the Superpower Survey a number of interesting facts were brought out. It is expected that the final report will be finished on June 30.

In making the survey 315 utilities were examined, representing a capacity of 4,000,260 kw., of which 11 per cent was hydraulic and 89 per cent steam. The output of these stations was 10,301,000,000 kw.-hr., hydraulic stations producing 16 per cent of this output and steam stations 84 per cent. The steam stations consumed 11,806,000 tons of coal at a cost of $63,228,000. The average coal rate was 2.73 lb. per kilowatt-hour. Although the maximum capacity of any steam plant in the territory was 163,000 kw. and that of any hydraulic plant was 83,500 kw., the average of all steam plants was found to be 10,000 kw., while the average of hydraulic plants was 2,700. An investment of $598,000,000 is represented by these plants, 85 per cent of the total being for steam plants and 15 for the hydraulic. Probably 25 per cent of the power requirements can be supplied by hydro-electric development. Standardization of 60 cycles as a uniform frequency was recommended.



PAST AND ESTIMATED FUTURE GROWTH OF ENERGY CONSUMPTION IN THE SUPERPOWER ZONE

W. S. Barstow presented an outline of a financial plan for the system. Under this plan a superpower company would be formed, having only one class of securities, *i.e.*, non-par value stock, and all existing public service companies in the territory, as they became customers of the superpower company, would be entitled to subscribe to this non-par stock of the company pro rata, based on demand and load factor or on some other predetermined definite basis. In case any public service company does not become a stockholder in the superpower company the stock to which it is entitled to subscribe can be offered for sale to the investing public.

After the presentation of this plan there was a discussion on the relative merits of a federal or state charter for the proposed company, but no definite decision as to a recommendation was reached. The accompanying chart shows the past and estimated future growth of energy consumption in the proposed superpower zone.

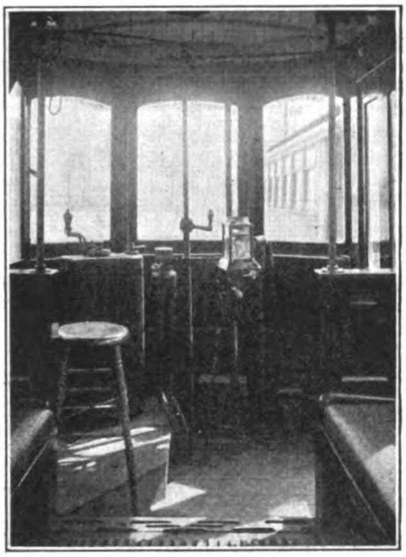
Equipment and Its Maintenance

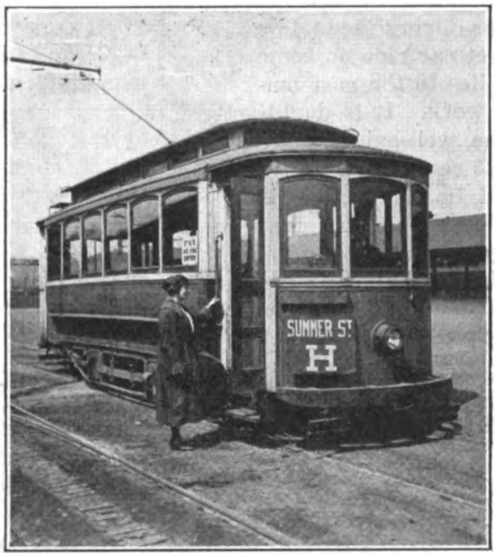
Short Descriptions of Tools Used Together with Mechanical and Electrical Practices of All Departments to Supplement the Preceding Longer Articles

Connecticut Company Remodels Cars for One-Man Operation

Platforms Were Reconstructed, Air Brakes Installed and All the Usual Safety Devices Were Added to Make the Car Suitable for One-Man Operation

THE Connecticut Company has remodeled forty-three single-truck closed cars and added additional equipment necessary to use them for one-man operation. The actual work of remodeling was done in several of the company's shops, and where new parts were constructed or others changed this was done in the reclamation shop at New Haven. In reconstructing these cars the center portions of the bulkheads were removed at each end, but the upper and lower end panels were retained. Two short stanchions were installed between the upper and lower end panels on each side to give the necessary support.


PLATFORM EQUIPMENT GROUPED TO PROVIDE MAXIMUM SPACE



ONE OF THE REMODELED CARS IN SERVICE IN STAMFORD, CONN.

CENTER ROW LIGHTING ARRANGEMENT WITH SHADES

The location of the platform equipment was changed and additional equipment was added in a location so as to provide as much space as possible for the entrance and exit of passengers. The K-10 controllers were moved to the extreme left and mounted on a raised platform used by the motorman. Between the controller and the door additional apparatus was installed consisting of the motorman's air brake valve, an upright stanchion with handle for operating the doors, the hand-sanding lever and an additional upright stanchion for holding the Johnson fare box. The hand brake staff was retained in its original location, but a drop handle was installed to afford more platform space.

While the original K-10 controllers have been retained, additional equipment has been added as required to provide the safety features for one-man operation. A type of dead man's handle, as shown in one of the accompanying illustrations, was designed by the engineers of the company, and the work of making the changes necessary in the handle was done in the reclamation shop in New Haven. By pressing down the button in the handle a lever engages a cam installed under the handle around the shaft in a location to replace the controller water cap. With the button depressed the cam is thus turned against the pressure of a coil spring inside the cam. The movement of this cam operates another small lever at the back of the controller, which in turn operates a push-button switch to close the circuit for the auxiliary line switch. Whenever the button in the handle is released the cam returns to its "off" position by the action of the spring and the operating circuit is opened by the line switch. The line switches used consist of the General Electric Company's SB-61-11 Auxiliary Form A contactors. Three Westinghouse H-350 push button switches were added at each end of the car. One of these push-button switches is located so that the opening of the door cuts off power and provides so that power cannot again be restored until the doors close. One of these, as just described, operates in conjunction with the handle on the controller to provide the dead man's device so that power will be shut off as soon as the operator releases the handle. The third switch is used as a foot switch so that operation can be continued without the necessity of holding down the dead man portion of the handle. These cars were originally equipped with two hood switches. One of these was removed and one is still retained as a switch for opening the circuit in case of emergency and as a switch ahead of the control equipment.

The remodeled cars were equipped with straight air brakes and the equipment used was taken from obsolete cars and open cars which were not being used. Old governors, engineer's valves, main reservoirs, brake cylinders and compressors were thus used. The compressors were some which were taken from the Birney type of one-man cars which the company has in operation. These were the General Electric CP-25 and Westinghouse DH-10 type, which were found of too small capacity for the Birney cars, which are equipped with pneumatic door engines, and they were used on these reconstructed cars, as the amount of air required is less than that which is used on the standard Birney car.

The brake cylinder is installed underneath one of the platforms and is connected to the brake rigging as originally installed for hand-brake operation. The same type of hand-operated sanders are used, but a new sanding lever was installed to make its operation more convenient for the motorman. These cars were provided with fixed steps, and two of these were retained without change. At the two entrances which were not used the doors were screwed shut and the steps were removed. At the entrances retained new folding doors were installed, arranged to open outward. The doors are hand-operated from a convenient location for the operator.

The lighting arrangement of the old cars consisted of two three-light clusters and one two-light cluster inside the car with additional lights on the platform and in the headlight to make a total of two five-light circuits. Some of the cars had poor headlining and it was decided to replace this, and at the same time a new lighting arrangement was provided, which consists of a row of five lamps down the center of the car, the additional lamps for the platform and headlight making a total of ten lights arranged in two circuits. The platform light is installed over the top of the door to provide illumination for the steps when the doors are open.

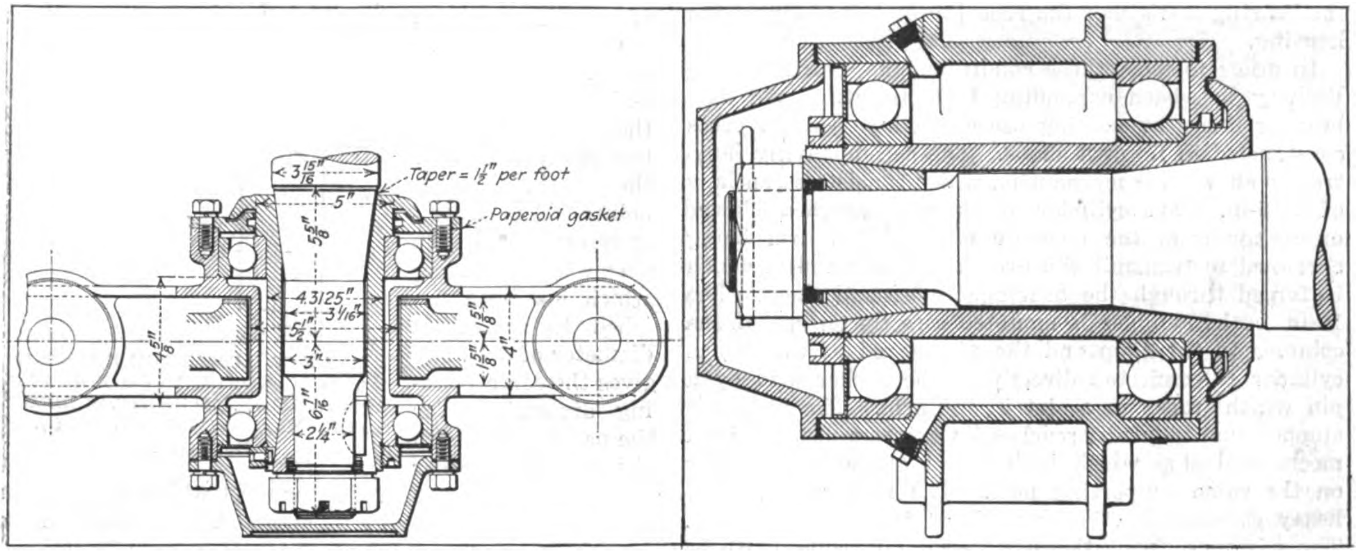
Originally these cars had two lights for each dash sign. One of these lights was used for the light over the door, the other being retained in its original position. The original trucks of the cars were retained, these consisting of Brill type 21-E, and the motors used are G.E. 67. These cars seat twenty-four and twenty-six passengers and are provided with longitudinal seats.

New Ball Bearing Journal Boxes

Journal Box Designed for Brill No. 79-E Truck and Interchangeable with Plain Sleeve Journal Box Developed Which Has Many Improvements Over Old Type

THE principal objection to the ball bearing journal boxes which have been tried out on electric cars during the past few years is the tedious and careful handling necessary in removing and assembling the boxes whenever it is necessary to replace wheels. After the journal boxes have been removed and replaced several times the bearings become loose on the axle and so cannot safely sustain the heavy shock loads imposed upon them for any length of time.

In an endeavor to overcome this objection the Gurney Ball Bearing Company has just brought out a new design, which is illustrated herewith. This type of journal box was designed primarily for the Brill No. 79-E truck and is interchangeable with the plain sleeve journal box now used, with the exception of the axle ends. As the ball bearings are of the angular contact type, mounted opposed to each other, they can be adjusted.



BALL BEARING JOURNAL BOX DESIGN FOR SAFETY CARS

The engineers of the Gurney company have found adjustments quite necessary, as no matter how efficiently the dirt seals are designed or how much attention is given to the lubrication of the bearings some will become loose, and this play must be taken up by means of the threaded nut at the outer end of the sleeve, if a long life of the ball bearings is expected.

In the new design the sleeve on which the bearings are mounted protrudes through the journal box inner cover and the cup flanged end acts as a dirt slinger. The sleeve is held in place by the tapered spring adapter sleeve and threaded nuts on the axle end, and as it is supported by the axle on the taper bored ends, the bearing loads are thus transmitted. A Woodruff key inserted into the slot of the adapter prevents any torsional pressure being transmitted onto the axle end nut. This relieves the cotter pin which holds the nut in place from any strain. Should the tapered spring adapter sleeve be clamped solidly between the bearing sleeve and the axle, for removing the journal box from the axle, a tapped hole for the insertion of a special tool to remove this sleeve is provided.

The whole journal box is handled as one complete unit and can very easily be assembled or removed from the axle to replace wheels or gears. The ball bearings are also not exposed and practically no foreign matter can get into the journal box even if the outside cover is taken off to remove the locking device which fastens the ball bearings to the axle.

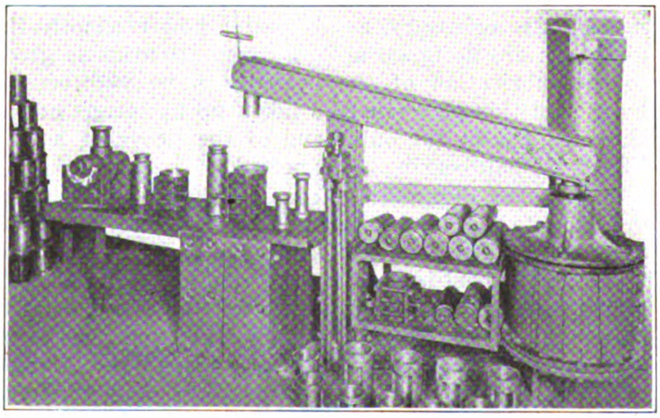
Expanding Railway Motor Bearings

To Provide a Tight Fit of Bearings in Their Housings, the Practice of the Third Avenue Railway Is to Expand Worn Bearings Slightly by Means of an Air-Operated Mechanism

BY H. J. KROMBACH
General Foreman Third Avenue Railway, New York City

THE problem of taking up the wear that occurs between the outside of bearings and their housings in railway motors has bothered many master mechanics. Probably the method most universally employed is to insert shims between the bearing liner and the housing so as to provide a tight fit. If this wear is not taken up in some manner after it has once started it increases very rapidly and ultimately leads to the scrapping of the bearing and either the reboring or rebushing of the housing.

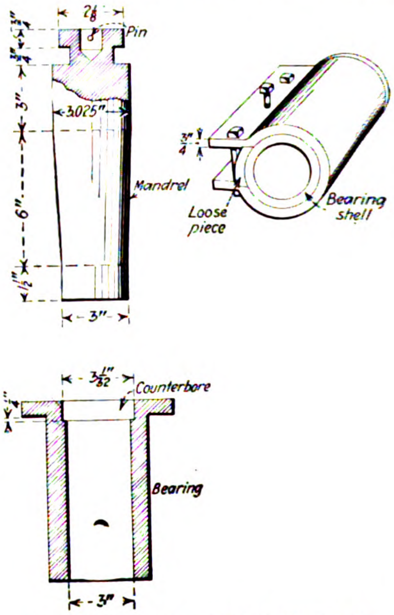
In order to meet these conditions the Third Avenue Railway has been expanding both armature and axle bearing liners by making use of an air-operated press constructed in its own shops. The accompanying illustration shows this mechanism, which consists essentially of a 16-in. brake cylinder to which is attached a lever or rocker arm, the opposite end of this arm being arranged to transmit the pressure to a mandrel which is forced through the bearings to expand them. The 16-in. brake cylinder is mounted directly on one of the columns in the shop and the piston rod of this brake cylinder is connected directly to the rocker arm by a pin which works in a slot in the arm. The piston is stopped just before it reaches its extreme position by a mechanical stop which is installed above the cylinder on the same supporting post. The rocker arm is of heavy construction, being made of two 6-in. channels. The distance from the piston-rod connection to the fulcrum is 38 in. and from the fulcrum to the point where pressure is applied to the mandrel is 19 in., so that a ratio of 2 to 1 is obtained. An air pressure of from 80 to 90 lb. is used for operating the mechanism. With an air pressure of 85 lb., 17,090 lb. is obtained on the brake-cylinder push rod and twice this amount, or 34,180 lb., is applied to the mandrel for expanding the bearings. The air for operating the cylinder push rod is controlled by an ordinary straight-air brake valve, such as is used on electric cars.


AIR PRESS FOR EXPANDING BEARINGS

A substantial table has been constructed to support the bearings while they are being expanded. This is supported immediately underneath the outside end of the lever by two large wooden blocks. The table itself is made of an iron plate and is 1½ in. x 18 in. x 4 ft. 8 in. in dimensions.

HOW THE BEARINGS ARE EXPANDED

In order to expand an armature bearing, it must first be made smooth and clean inside. To prevent the cracking of the end flange during expansion it has been found necessary to bore out the flanged end to a diameter approximately 1/32 in. larger than that of the remainder of the inside of the bearing. The depth of this portion of larger diameter should be approximately ¼ in. greater than the depth of the flange. This enlarging of the bearing under the flange removes the strain at that point. An accompanying sketch shows a bearing which has been finished to an inside diameter of 3 in. and gives the corresponding dimensions for the parts underneath the flange, together with the dimensions of the mandrel which is used for expanding such a bearing. The mandrel is tapered from a bottom diameter of 3 in. to a top diameter of 3.025 in., the bottom end being made straight for 1½ in. and the top for a distance of 3 in. To facilitate the handling of the mandrels a flanged top is turned on them, which is bored out inside and a pin is then inserted through this portion so that the mandrel can be readily lifted and handled with a hook.



AT LEFT, ARMATURE BEARING AND MANDREL USED FOR ITS EXPANSION. AT RIGHT, SLEEVE FOR HOLDING ARMATURE BEARINGS

To provide for uniform expansion and to support the bearing a sleeve is placed around it while it is being expanded. This is made of ¾-in. steel and is open on one side. When the bearing has been inserted a loose piece is placed in this open space and the entire sleeve is then clamped around the bearing by means of two bolts, as shown in the accompanying illustration.

The operation of expanding an armature bearing consists first of heating the bearing to a temperature of about 75 deg. F. The window of the bearing is then placed against the closed side of the sleeve and the open side of the sleeve is closed with the loose filler as already explained. The sleeve is then tightened into place with the two bolts and the bearing is then placed on the bench with the flanged end uppermost and the mandrel, which has previously been coated with a little white lead, is placed in the upper portion of the bearing. Pressure is then applied and the mandrel is forced entirely through the bearing. The plate on which the bearing rests is provided with a hole of sufficient diameter so that the mandrel will go through this and drop down approximately ¼ in. below the surface of the table. In pushing the mandrel through the bearing air should be applied slowly and uniformly. After the mandrel has been pushed through, the bearing can be removed by loosening the two clamping bolts and screwing in a third bolt which is located in the center of the sleeve. This expands the sleeve sufficiently so that the bearing can be readily taken out. The mandrel is lifted through the hole in the table by means of a hook, to which is attached a cable and handle. The bearing is then allowed to cool and then it is again pressed with the same mandrel as previously used.

These operations will expand an ordinary armature bearing about 1/64 in. and the outside of the bearing can then be turned down so as to give a tight fit in its housing, and the inside can be babbitted and turned to the necessary size to fit the armature shaft.

SHAPING AXLE BEARINGS

As axle bearings of the usual type are made in two parts, these are pressed into shape and expanded by use of a type of mechanism shown at the left hand end of the halftone illustration. A large steel block is bored out approximately 0.01 in. smaller than the diameter to which it is desired to have the outside of the axle bearing. The round bar which causes the spreading apart of the bearing is made approximately 0.01 in. larger than the inside diameter of the finished bearing. These bearings are expanded by placing them in a horizontal position and by use of the mechanism already described.

This mechanism is also used for forcing bushings in worn housings. Where the housings are worn to such an extent that rebushing is necessary, a cast steel bushing approximately 3/16 in. thick is forced into the housings and these are then bored out to exact diameter. The ends of these bushings have a flange and are pinned in place after they are installed. During the past year more than 800 armature bearings have been reclaimed by this method, most of which would have been scrapped had not some such apparatus been available.

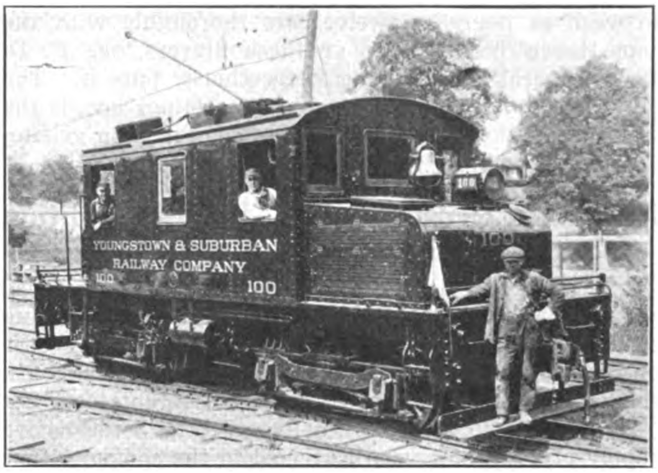
New Locomotive for Youngstown & Suburban Railway

THE Youngstown & Suburban Railway has recently placed in service a standard Class B, 45-ton Baldwin-Westinghouse locomotive, which was made necessary due to the increase in carload freight business. A large part of this business is made up of building materials handled by steam road equipment to a new tipple of a construction company. When completed, the total trackage from the railway company's switch to the end of the tipple will be more than 1,000 ft. and the total length of the tipple itself will be 550 ft., with bins having a capacity of approximately 3,000 tons of material. The various bins under this tipple are for the storage of sand and gravel and other building materials and will be arranged so that a 4½-ton truck can be loaded in 2 minutes. Directly opposite the tipple there is to be constructed 1,100 ft. of track with a clear space of 900 ft., which will be used for handling brick, tile, sewer pipe and similar material. At the right will be constructed garages and barns for thirty-five motor trucks and wagons and fifteen horses, and on the left will be warehouses, office buildings, etc.

NEW LOCOMOTIVE FOR YOUNGSTOWN & SUBURBAN RAILWAY

Weight	45 tons
Maximum tractive effort (25 per cent adhesion)	22,500 lb.
Normal tractive effort at 9.7 m.p.h., full field, one hour	15,200 lb.
Continuous tractive effort with forced ventilation, short field	9,000 lb.
Maximum trailing load starting on 1 per cent grade	789 tons
Balancing speed, short field at 600 volts, on level with 500-ton load	17.5 m.p.h.
Balancing speed, short field at 600 volts on 2.05 per cent grade with 350-ton load	10.2 m.p.h.

The new locomotive just purchased is equipped with four type 562-D-5, 600-volt, 100-hp. field control motors and HLF control. The maximum grade for this property is 2.05 per cent and the locomotive will handle five loaded 100,000-lb. capacity cars, or a train of fifteen empties, up this grade.

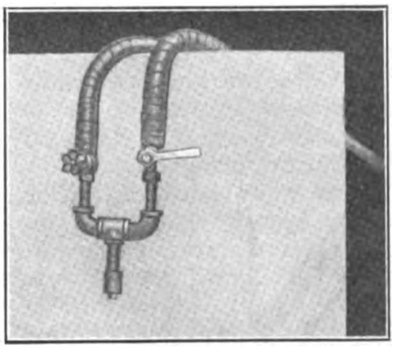


FORTY-FIVE-TON LOCOMOTIVE OF YOUNGSTOWN & SUBURBAN RAILWAY

The general characteristics of this locomotive are as shown in the accompanying table.

Cars Washed with Air and Water Flusher

A GREAT saving in cost of washing cars is now being realized by the Chattanooga Railway & Light Company by the use of its combination air and water nozzle, an illustration of which is shown herewith. This is one of the many convenient devices which have followed the installation of the new air compressor in the Chattanooga shops. It is a National compressor type 3VS-23, of 300-cu.ft. capacity and driven by a single-phase, 54-hp. motor. The flushing device consists simply of two ½-in. rubber hose lines, one for air and one for water, each leading through suitable controlling valves to a common nozzle. The whole device is a combination of ordinary pipe fittings. From the two valves there are bushings to ½-in. ells, which in turn lead to a tee, to which is connected another short bushing which is plugged at the end, a ⅛-in. hole being bored through the plug. Any combination of air and water can be discharged from this nozzle.



AIR AND WATER NOZZLE

The present method of cleaning out cars consists of first using the air line to blow out dust, after which a powerful stream of water is provided for flushing out the car, air and water being used here in combination. The results obtained by the use of this combination air and water stream are much better than from old hand-scrubbing or flushing out with water stream only, both from the cleanliness resulting and from the saving in time.

Under the former method of cleaning eight cars constituted a good day's work, whereas it is now possible to wash as many as twelve cars thoroughly with the same labor "besides two or three flivvers," as E. D. Reed, general superintendent, facetiously puts it. The only difficulty encountered, which is a minor one, is the handling of the double-hose line to keep it from getting twisted.

New Rock Crusher an Economical Addition at Charlotte

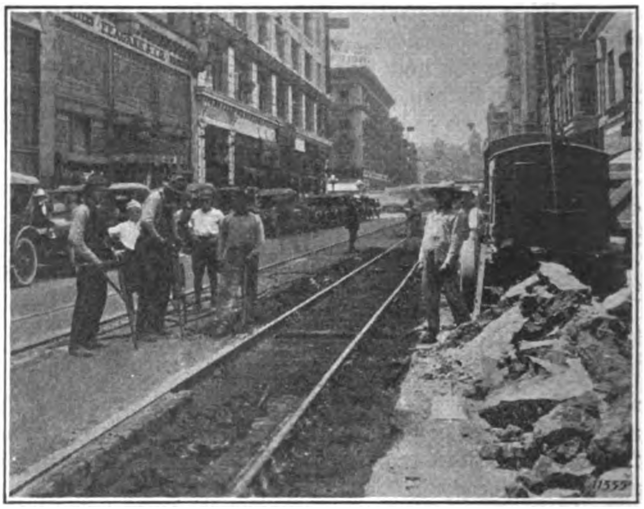
THE Southern Public Utilities Company has installed in Charlotte, N. C., a rock crusher which is proving to be a most economical addition. This company uses on the average about 200 yd. of crushed rock per month the year around. This had formerly been obtained at a cost of about $6.25 per ton delivered. With the native supply of rock, however, it seemed to the company that it should be possible to obtain this at less expense.

Accordingly, last December the company installed an Allis-Chalmers rock crusher with a capacity of 60 yd. per day and records since then indicate that the over-all cost of the crushed rock is now $2.50 as compared with the previous $6.25. Farmers and others haul rock into Charlotte and deliver it for $1.50 per ton, the other dollar representing the cost of crushing. In addition to crushing new rock, the crusher is also used to break up old cement and brickbats which are excavated by various contractors in connection with work in and around Charlotte.

Accompanying illustrations show the rock crusher and indicate how it is conveniently located by a siding of the company's electric railway in Charlotte. The crusher installation includes a belt conveyor which carries the rock with a minimum expense of handling. The crusher is adjustable to produce crushed rock from about ¾ in. to 3 or 4 in. in size. The company is well satisfied with this move it has made to produce its crushed rock more economically.

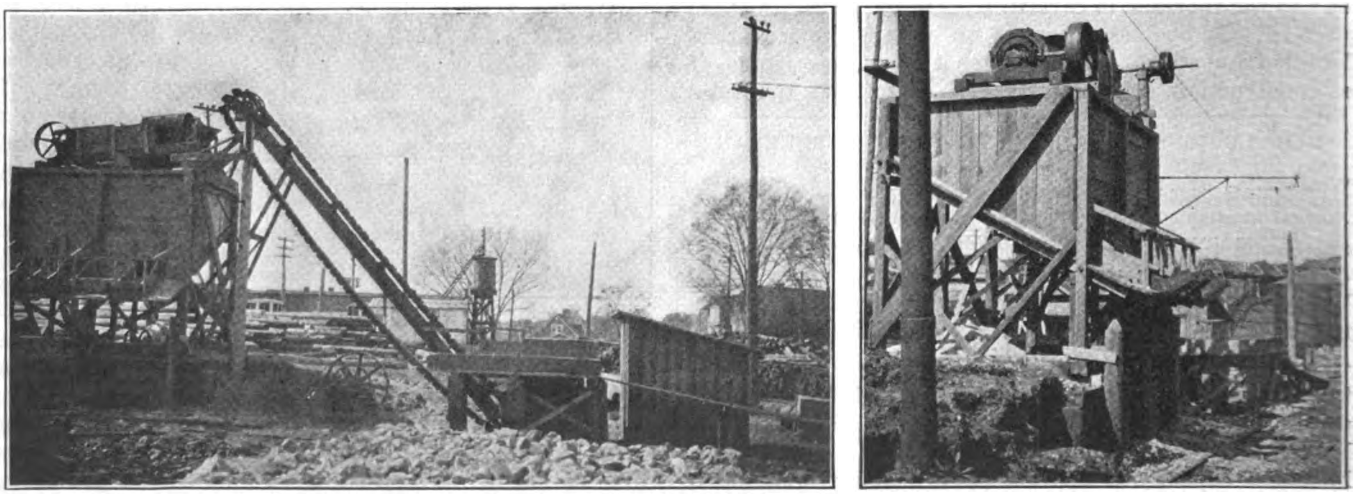
New Machines for Removing Pavement

A NEW compressed-air-operated machine for removing pavement and general demolition work has just been placed on the market by the Ingersoll-Rand Company, New York. Two types of paving breakers, termed BC-25 and CC-25, are now available. The BC-25 type is intended for use with an air pressure of over 80 lb., while the CC-25 is for use with an air pressure less than 80 lb. The BC-25 type weighs 58 lb. and is 24 in. over all, while the CC-25 weighs 68 lb. and is 25 in. long. Both have a 4-in. stroke. In construction the paving breaker is very similar to the non-rotating type of hand hammer rock drill.


REMOVING PAVEMENT ALONG RAILWAY TRACK

The Los Angeles Railway Corporation used these breakers for cutting openings on either side of the rail through 6 in. of concrete having a covering of 2 in. of asphalt. The openings were about 23 in. long and extended 17 in. on each side of the rail. In this work it was found that two men with one paving breaker could cut twenty-two of these openings in nine hours. Under the old hand method this work would have required fifteen men. These openings were cut in order to give gripping place under the rail for the use of hydraulic jacks to pull the rail out.

The paving breakers are usually used in conjunction with the Imperial type 14 portable air compressors, which are either gasoline or electrically driven.


TWO VIEWS OF ROCK CRUSHER INSTALLED AT CHARLOTTE, N. C.

Letter to the Editors

Suggested Changes in Safety Car Design

TRENTON & MERCER COUNTY TRACTION CORPORATION

TRENTON, N. J., May 12, 1921.

To the Editors:

In a recent issue of the ELECTRIC RAILWAY JOURNAL there appeared an article by J. C. Thirlwall entitled "Why Alter the Standard Safety Car Design?" I am heartily in accord with most of Mr. Thirlwall's objections to fundamental changes in the general design of the standard Birney safety car, but our experience in the operation and maintenance of this type of car has convinced us of the desirability of several changes which could be made without sacrificing the essential features, such as dimensions of car body and low wheels.

In the March 12 issue of the ELECTRIC RAILWAY JOURNAL mention was made of the substituting of longitudinal seats running the full length on either side of our cars in place of the standard transverse seats. The object of this change was to determine whether the increased aisle width thus provided would not facilitate the loading and unloading of passengers at points of heavy interchange here in Trenton. The effect of this change has been to speed up passenger interchange and has tended to give a more even distribution of the passenger load over the entire car. Most of the crowding on the front end of the cars was due to the passengers' inability freely to move to the rear of the car on account of the restricted aisle space. By increasing the aisle width this handicap has been removed.

There are two other changes in the construction of the safety car which the management here feels would be beneficial and which could be made without increasing the weight or dimensions of the standard car. These are the substitution of a longitudinal seat for the first transverse seat at each end of the car on the entrance side and the elimination of the folding door opening outwardly by substituting a sliding door.

In regard to the safety features, we are considering changes to make the foot valve inoperative. With the many duties which are necessary for the one-man car operator to perform, there is a tendency to abuse this auxiliary to the controller pilot valve, and in considering the accidents which have occurred here in Trenton it has been found that this feature has been directly responsible for a large number.

Another improvement which could be advantageously made in the interests of safety is the removal of the door operating position from the brake valve. By eliminating this feature the brake valve could be redesigned so as to give more space between the various brake valve positions and thus decrease the liability of error. A number of accidents have been caused here due to the fact that in making a service brake application the operator sometimes throws past the service position to lap position, which is between the door opening and service application positions on the brake valve. If more space were available, a longer port and a greater radius could be obtained for the service application position, and the lap position could be moved further away so that there would be less liability of mistake by the operator. While these two changes may be considered quite radical, we feel that they have a special appeal to maintenance men and operators.

H. E. KROUSE, Master Mechanic.

Association News

Acting Secretary Welsh Addresses Yale Students

A PERSPECTIVE view of electric railway problems was given in a course of two lectures by James W. Welsh, acting secretary of the association, before the engineering students at Yale University, New Haven, Conn., on March 6 and 13.

He first dealt with mechanical and electrical studies such as the application of motor control and auxiliary equipment to railway cars and the economic problems connected with the replacement of old reciprocating type of plants by power generated in large central stations. In the former the development of the present high-speed motor was illustrated by the redesign of a standard city motor for interurban service.

The second lecture took up the traffic problems of a city system, illustrating the surveys to be made, the means of fitting the service to the traffic, and a review of the methods now employed for securing the maximum economy in car operation. The preparation of a working schedule or time-table was shown, starting with the traffic count and with special consideration given to the determination of the trainmen's runs as limited by the rules of the labor agreement.

Mr. Welsh employed a conversational method of questions and answers with the students and pictured the subject in such a way as to give them some realization of the difficulties involved as well as the attractiveness of the work in the field of transportation as a future business of life.

Heavy Traction Men Meet

A NUMBER of the heavy traction experts in the Engineering Association met on May 12 to round out the report of the committee on this subject. A sub-committee presented a remarkable compilation of data on electric locomotives and multiple-unit cars which was accepted for inclusion in the report with a few additions. A plan was also approved for the preparation of an analysis of conditions affecting the use of multiple-unit versus locomotive-drawn trains for suburban service, as a substitute for the statistical summary originally planned. The desirability of co-operation among heavy traction committees of national societies was again emphasized and a determination to push this matter was registered. The committee finally decided to compile a subject bibliography on heavy traction to be used as an appendix to its 1921 report.

Those in attendance were Sidney Withington, New Haven Railroad, chairman; A. H. Armstrong, General Electric Company; H. W. Cope, Westinghouse Electric & Manufacturing Company; J. C. Davidson, Norfolk & Western Railway; C. V. Duer and J. S. Sloan, Pennsylvania System; C. H. Quereau, New York Central Railroad; L. S. Wells, Long Island Railroad.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Radial Scheme Favored

Mr. Arnold Believes Ambitious Canadian Project Entirely Feasible Under Competent Management

Bion J. Arnold, Chicago, considers that the radial program of the Ontario Hydro-Radial Commission is very advantageously situated with regard to density of population, active industrial territory and probable increases of both these factors in the future, as well as having the advantage of a plentiful supply of cheap power.

In testifying before the commission during the week ended April 30 Mr. Arnold pointed out that carload shipments in large volume have not usually been handled by the average interurban electric line, but that with the type of construction and facilities proposed by the Hydro-electric Commission for the radial lines, they would be in a position expeditiously and economically to handle a reasonable amount of carload freight business.

Taking into consideration the estimated population in 1925, 1930 and 1935 of the various territories served by the different lines, Mr. Arnold showed three lines, the Toronto & Eastern, the Toronto Suburban and the Hamilton & Elmira divisions, as having slight deficits in 1925. He pointed out, however, that these deficits were figured on construction costs estimated at the high peak period of about a year ago. In view of reductions in cost since that time he thought that the newly constructed lines might be found to pay from the start. The Toronto, Hamilton & St. Catharines and the Niagara, St. Catharines & Toronto radials, he estimated would be paying propositions right from the start, having a net income or surplus of $145,000 and $129,000 respectively in 1925.

$800,000 SURPLUS ANTICIPATED

By 1930 Mr. Arnold estimated that the whole system would show a surplus of $796,000 on the year's operations, and by 1935 this would be increased to more than $1,000,000.

One point emphasized was that of terminal facilities and grade separation in the cities. The radials must be able to enter and leave the cities at high speed. Regarding the proposed Toronto terminal at Bay Street, he suggested a combination of elevated structure and subway leading from it. The overhead track would end at Front Street, and the cars would then enter a subway extending up to Queen Street. He favored an uptown terminal nearer the business center, but was not ready to state just where this should be located.

The radials would have an advantage in handling less-than-carload freight.

Summing up the transportation requirements, it would appear that the area in which the system is proposed, being the center of population and manufacture of the province, should be provided with every transportation service which will aid its commercial and industrial welfare. This should include transportation facilities of the type proposed by the Hydro-electric Power Commission, the main feature of which is frequent passenger transportation at high speed, supplemented by frequent and prompt deliveries of less-than-carload freight.

LARGE CAPITAL EXPENDITURES REQUIRED BY STEAM ROADS

For the steam roads to give the facilities required and proposed by the Hydro-electric Commission, they would have to make large capital expenditures and would also have to organize additional operating departments properly to handle the different classes of service required.

Regarding fast freight service, Mr. Arnold recommended that as it is proposed to furnish this to all points on the line. This freight would be carried on interurban express and on freight cars which, as a rule, would make two trips daily between the various terminals, providing for one-day shipments from point to point.

The estimates as to earnings had been made separately for the five divisions, and all passenger-earning estimates are based upon population figures and data as to the riding habit of the residents of each locality.

While the system as a whole cannot be compared with any existing interurban, combining, as it does, rapid transit, suburban and interurban features, with despatch and carload freight traffic, each of these classes of service has its parallel in existing systems, and when analysis of the estimated operating costs of these classes of service has been made, they lead to the conclusion that the project now outlined as a whole is feasible, and that if constructed and operated under competent management, with the support of the communities served, success for the road can be reasonably expected.

Readers, Note Well

The United States Civil Service Commission announces an open competitive examination for senior signal engineer. Applications must be filed with the Civil Service Commission, Washington, D. C., prior to the hour of closing business on June 7, 1921.

Union Contract Renewed

Winnipeg Railway Makes Reservations on Wages and Rejects "One Big Union" Idea

The Winnipeg (Man.) Electric Railway has signed an agreement with its motormen and conductors for the next twelve months, granting the trainmen the same wages and working conditions as prevailed last year.

The 1920 agreement was made between the company and "the Street Railway Men's Union," an independent organiation with no affiliation with the Internationals or any other body. After the agreement of May 1, 1920, had been signed the trainmen joined the One Big Union—a political organiation with revolutionary tendencies which was directly responsible for the strike of six weeks in Winnipeg in 1919.

When the 1920 agreement was about to expire the Street Railway Men's Unit of the One Big Union demanded that the company sign its agreement with them as representing the O. B. U., thus giving recognition to this body. This the company positively refused to do and declined to negotiate with the O. B. U. at all.

EMPLOYEES WITHDRAW DEMAND FOR UNION RECOGNITION

The company said it was prepared to negotiate an agreement with a committee of men, but that if the men insisted on recognition of the O. B. U. the company would go to arbitration and open up the whole agreement as to wages and working conditions. After several mass meetings the demand for recognition of the O. B. U. was withdrawn, the men appointed a committee to represent them, and an agreement was signed on May 9 between the company and "Motormen and Conductors of the Winnipeg Electric Railway as represented by a committee executing this agreement."

In all its agreements so far executed with its employees the company has stipulated that it will maintain the same rate of wages as prevailed last year.

The agreements contain a clause, however, which says "if at any time during the currency of this agreement, by any reason of something beyond its control the company is deprived of any considerable portion of its revenues, and is thereby rendered unable to pay the wages herein agreed to, the company shall be at liberty to give thirty days' notice to terminate this agreement insofar as it affects the rates of wages."

Wages Reduced by East Mass. Arbitration Board

Cut Made Averages 12½ per Cent—Burdensome Seniority Rules and Other Provisions Modified

An average wage reduction of 12½ per cent, elimination of burdensome seniority rules and certain overtime and special allowances featured the decision handed down by the Massachusetts Board of Conciliation and Arbitration in the case of the Eastern Massachusetts Street Railway and its employees who are members of the Amalgamated Association. The ruling of the board was announced on May 14, but is retroactive to May 2, the date when the former agreement expired, to be in effect for one year to May 1, 1922. An immediate reduction in fares is planned.

PRIOR to the expiration of the old agreement the trustees of the Eastern Massachusetts had announced that wages would be cut 20 per cent, and further proposed to cancel the entire agreement. Threats of a strike on the system were heard, and up until the last day of the old agreement it appeared as though no settlement could be made which would avoid a walkout of the men.

On the final day, however, both sides agreed to submit the case to arbitration by the State Board, and arrangements were made to have the case heard and settled promptly. Before going to the board the trustees and the men drew up a new agreement, leaving only the questions of wages, overtime and certain other provisions, twelve points in all, to be arbitrated.

Public hearings were commenced on May 5 and completed on May 9, the decision being given five days later. The case for the company was conducted by Arthur G. Wadleigh, himself one of the trustees. The employees were represented by Attorney James H. Vahey.

Evidence relating to the decline in cost of living was introduced by both sides, Prof. Albert S. Richey testifying as a witness for the company, and Arthur Strugis, connected with the statistical bureau of W. Jett Lauck at Washington, as a witness for the union. Professor Richey produced figures indicating an average decline in the cost of living since May 1, 1920, of 22½ per cent, and predicted a further slow but continuous reduction in prices. Mr. Sturgis contended that costs are still double the pre-war basis, and that any apparent decline is only a temporary seasonal fluctuation.

The company introduced statements relative to the still precarious financial condition of the property, and although the attorney for the employees claimed it should not be considered in fixing wages, the board did not rule it out. What consideration the board gave to this matter, if any, the members did not state in their finding, although they referred to it as having been introduced.

The new scale of wages for motormen and conductors will be 49 cents, first 3 months; 52 cents, next 9 months; and 54.5 cents thereafter, as compared with 56, 59, and 62 cents respectively under the former agreement. The differential of 5 cents for operators of one-man cars remains unchanged, although a strong effort was made by the union to have it increased to 15 cents. Nearly 90 per cent of the car mileage of this property is operated with one-man cars.

The old and new rates fixed for other employees under the amalgamated agreement is as follows:

Occupation	Old Rate	New Rate
REPAIR SHOP AND ROLLING STOCK		
Assemblers	62	54.5
Blacksmiths	62	54.5
Blacksmith helpers	58	51
Babbitters	60	52.5
Carpenters	62	54.5
Carpenter helpers	58	51
Car cleaners	58	51
Firemen	62	54.5
Machinists	63	55.5
Machinists helpers	58	51
Painters	62	54.5
Pattern makers	62	54.5
Pitmen	61	53.5
Pitmen helpers	58	51
Upholsterers	61	53.5
Upholsterers helpers	..	....
Watchmen	58	51
Winders	63	55.5
Winders helpers	58	51
Wiremen	62	54.5
Wiremen helpers	58	51
Letterers	64	56
Tuckmen	62	54.5
Truck helpers	58	51
General helpers	58	51
Electricians	62	54.5
TRANSPORTATION DEPARTMENT		
Crossing tenders	58	51
General helpers	58	51
POWER PLANT		
Assistant engineers	76	66.5
Firemen	66	58
Foreman of helpers	66	58
Firemen helpers	62	54.5
General helpers	59	52
Oilers	62	54.5
Pipe coverers	66	58
Repairmen	64	56
Substation operators	62	54.5
Switchboard operators	65	57
Hoisting engineers	68	59.5
ROADWAY DEPARTMENT		
Trackmen	58	51
LINE DEPARTMENT		
Linemen	67	59
Linemen helpers	59	52
STORES DEPARTMENT		
Chauffeurs	58	51
Helpers	58	51

The twelve specific issues arbitrated and the board's decision in each of the issues were as follows:

1. Shall basic wages be reduced to the scale in effect April 30, 1920? Answer: That there shall be a reduction in the basic rate now in force of 12½ per cent. Where this reduction when applied to the hourly wage results in a fractional part of a cent a fraction of five mills or less shall be paid for as half a cent; fractions over five mills shall be paid for as 1 cent.

2. Shall there be any change in the differential paid to men while operating one-man cars? Answer: That there shall be no change in the differential of 5 cents per hour paid to operators of the one-man car.

3. Shall seniority be abolished? (A) in shops; (b) in carhouses; (c) in track departments; (d) in power plants; (e) in the line department? Answer: Yes, in all classes specified.

4. In case of a curtailment of force shall employees hold their seniority rights for a period of six months so that in case of increasing force they shall be returned to the service in accordance with such seniority before any new men are hired? Answer: No.

5. Shall the computation of time for runs of conductors and motormen be changed from computation to fifteen minutes and half hour periods to computation to ten minute periods? Answer: No.

6. Shall relief for thirty minutes or less be paid for? Answer: Yes.

7. Shall employees in the mechanical and miscellaneous departments be allowed ten minutes under pay to wash up? Answer: No.

8. Shall men in the mechanical and miscellaneous departments who work eight hours on Sundays and holidays and nine hours on week days be paid nine hours' pay for the eight hours' work on Sundays and holidays? Answer: No.

9. Shall employees be paid at the rate of time and a half for work done on Sundays and holidays? Answer: (A) In shops, in carhouses, in track department, in power plants, in the line department. No in all classes specified.

10. Shall employees in the mechanical and miscellaneous departments when doing overtime work be paid compensation in addition to their regular hourly rates? Answer: Yes, at the present rate of time and a half.

11. Shall employees in the rolling stock shops be allowed Saturday half holiday with pay? Answer: No.

12. Shall it be provided that regular employees of the mechanical and miscellaneous departments, who have worked one continuous year or two consecutive full track seasons, shall not have their wages reduced by reason of occasional rainy or inclement weather? Answer: No.

The decision of the board affects in all about 1,850 out of the 2,400 employees of the Eastern Massachusetts Street Railway. Both sides had agreed in advance to abide by the decision of the arbitrators.

The following brief statement was included in its official findings, as the basis of the board's decision:

> It appears that the increase in wages received by the employees upon this system since Oct. 1, 1914, has exceeded in percentage the increased cost of living during the same period. The board recognizes that the justification for such increase was not entirely based upon the increased cost of living. It is generally recognized, however, that such increase has been the controlling factor in justifying the increase in wages of the employees during this period, and further that there has been a substantial decrease in the cost of living, the official report of the Massachusetts Commission on the "Necessaries of Life," covering the period to May 1, determining such decrease from July 1 to be 18.8 per cent. After an examination and consideration of the evidence, including exhibits twenty-eight in number, together with the able arguments of counsel, the board determines that a reduction in wages is warranted at the present time.
>
> The board finds sufficient reason for including in the new agreement certain of the working rules and conditions submitted, but as to the remainder, whatever reason there may have been for their adoption, the board finds no sufficient justification to warrant their continuance.

In accordance with their promise to the public, the trustees of the Eastern Massachusetts Street Railway are planning to put a reduced scale of fares into effect in the immediate future. As soon as the percentage of the wage reduction was made known, they commenced the preparation of a new scale of ticket fares, all over the system, which they expect to announce within a few days.

Nova Scotia Company Cuts Pay.—A general wage cut of from 8 to 10 per cent was put in effect on May 1 by the Cape Breton Electric Company, which operates the interburban tram lines of the island.

Deferred Payment of Taxes Proposed

A bill which would require electric railways operating in Connecticut to pay up their back taxes within a period of six years has been reported by the finance committee of the Connecticut Legislature. The amount of unpaid taxes due at present is about $2,000,000. The bulk of this approximately $1,800,000 is owed by the Connecticut Company.

The measure would require each year the payment of one half the annual net income of the companies, in addition to the tax for that particular year. It would go into effect on July 15, 1922, and the taxes for the present year would be deferred until that time, and added to the total of unpaid taxes. Companies which pay up their indebtedness within six years' time would under the provisions of the bill pay interest at the rate of 4½ per cent, while from those not completing payments 8 per cent would be levied. By the time the first payment would come due, it is estimated that the Connecticut Company would be in debt to the State to about the sum of $2,500,000. The first payment would be in the neighborhood of $750,000.

The president and treasurer, or receiver, of a company would be required to file an annual statement under oath showing the amount of each item, of which the gross and net income respectively is made up. The net income is to be computed by deducting from the gross income items of operating expenses, expenses of auxiliary operation and leased roads, miscellaneous rents, taxes paid, interest on funded debt, interest on floating debt and miscellaneous charges for the preceding year.

Unions May Be Sued in Massachusetts

An amendment to the General Law of Massachusetts, governing voluntary associations, has just been enacted, which permits all such associations to be sued. The progress of this amendment through the Legislature was marked by the most bitter opposition on the part of organized labor interests. The representatives of labor claimed that the bill was aimed directly at the unions, and sponsored by the financial interests, as it lays the union organizations, as well as other associations of individuals, open to suit.

The objection of the union interests was directed less against the principle of subjecting them to suit, than to the alleged liability of having their funds tied up by employers bringing suit when a strike may be in progress. This, the union interests claim, may be resorted to, in order to break a strike, as the union would be unable to pay its members strike benefits, and expend funds for other purposes which are considered essential in the conduct of a strike.

The strike was termed labor's only weapon, and this legislation was condemned as an attempt to weaken labor's one source of strength.

In spite of this opposition the amendment was passed and sent to the Governor. The labor people then carried their fight to the Governor's office, urging him to veto the bill. After hearing all the objections and giving due consideration to the subject, Governor Cox signed the bill. He made a public statement on the matter, saying that the bill was not aimed at labor, but it included a number of other voluntary associations, all of which should be subject to suit at law as well as labor unions. He called attention to the fact that similar legislation is in force in twelve other states, and advised the labor unions that their interests were sufficiently protected.

Day of Emergency Rates Gone

The Board of Public Utility Commissioners of New Jersey will no longer allow temporary rate increases to cover so-called emergency periods, Chairman John J. Treacy of the board announced on May 17, and added that all the factors of a normal rate-making case must be before the board before a decision is made.

Chairman Treacy declared that the theory will no longer hold that was developed during the war to the effect that temporary rates must be granted to tide utility concerns over a period of abnormal costs.

The announcement of Chairman Treacy was made when Rankin Johnson, president of the Trenton & Mercer County Traction Corporation, appeared before the board seeking a date for the cross-examination of Ford, Bacon & Davis, who appraised the company's property for the State when the railway applied for an increase in fare of from 7 cents to 10 cents.

According to law the commission must render a decision in the case by May 31, otherwise the company has the right to put into effect the 10-cent rate.

Mr. Johnson was asked to agree to an extension of this time until June 15, stipulating upon behalf of the company that the new rate would not become effective until the board reached its decision. To this Mr. Johnson demurred, declaring that an emergency existed and that the company's financial situation was desperate. He asked that a temporary rate be granted until the permanent rate could be formally established.

Chairman Treacy of the board in the course of his remarks said:

> The board is reluctant to extend a theory which was developed to cover a national emergency, the war, beyond the period of the emergency itself. This board is not going to grant any emergency applications unless the situation is so critical that it is imperative for it to do so.

Commissioner Harry V. Osborne indicated that he thought that continual changing of utility rates was unsettling to the public and to financial conditions generally. The board fixed May 31 for the continued hearing in the Trenton case.

Large Area for Future Development Opened

Governor Miller of New York recently signed the bill proposed by Senator Smith of Staten Island which will give Staten Islanders rapid transit facilities between Richmond and New York City within three years. For over twenty years residents of the island backed by big business interests have fought for a transit connection between the Borough of Richmond and Brooklyn. The passage of the new law will require the city to begin within two years the construction of a passenger and freight tunnel between the two places. Governor Miller commenting on the bill said:

> Such a tunnel must necessarily be a part of any comprehensive plan for the development of the port. Indeed, it appears to me that it is one of the obvious things that may speedily be done to relieve congestion and to eliminate much of the costly with a terminal service now required, for by that means it should be possible to provide direct service from the transcontinental railroads to a large territory with a rapidly growing population now cut off from such service. Such a tunnel, with proper connections, will bring the transcontinental railroads to the very centre of the great metropolitan district.
>
> The city of New York already is expending a large sum in the construction of docks on Staten Island and it would seem that transportation means other than by water between Richmond and the other boroughs should be provided as speedily as possible.
>
> The need of such a tunnel is obvious. Its building has now been too long delayed. Nothing can be done under this bill before another session of the Legis-estimates.

Electric Equipment Sale May Settle Title Question

Because he built on an island, made in the middle of the bay, title to which bottomland has been vested in the city but without the right to transfer it, Carl G. Fisher, developer at Miami, Fla., has offered to sell for $1,125,000 an electric power house for lighting and power, carhouses and other equipment that cost him $1,265,403. By the purchase the tangle over the title question would be settled. The island was built up by the Fisher interests after the bay bottom had been purchased. Mr. Fisher also offered to sell the trolley line of the Miami Beach Electric Company to the city, "and not at a profit either."

At the conclusion of the general discussion, the offer having been made in an open meeting of the City Council, City Attorney S. P. Robineau was authorized to go to Tallahassee, the state capital, to take up with the Internal Improvement Board the question of title, with the hope that there might be still some way out of the tangle. The tangle actually dates back to a state law a dozen years ago, deeding to Florida cities all submerged lands within their corporate limits, but with the proviso that title shall always be vested in the municipality. Later the Fisher interests approached the Internal Improvement Board, which controls state lands, and neither thinking of the state law, the board sold the Fisher interests eleven acres of bay bottom.

Municipality Follows Up Its Advantage

The figures of the Detroit (Mich.) United Railway on the cost of constructing the 25 miles of day-to-day lines which the city electors voted to take over have been submitted to the city. The total cost of these eight lines is placed at $1,965,942, or approximately $80,000 per mile. Accountants for the city will check over the figures submitted by the company and engineers for the city will go over the lines with the company's engineers to determine depreciation.

Arbitration of the construction costs and depreciation will be urged by the city as soon as the figures have been gone over, since Mayor Couzens is anxious to have the question of costs settled before the city declares itself ready to take over the lines. E. W. Bemis, Chicago, has been retained by the city to appraise the eight day-to-day lines.

Announcement has been made by Mayor Couzens that the electors of Detroit will be asked to vote at the next election on the question of giving the Street Railway Commission power to acquire the Fort Street and Woodward Avenue lines, Detroit United Railway lines for which the franchises have expired. This is the first action taken in regard to these lines since the April 4 election when the company's service-at-cost plan was defeated.

Railway Firm—Will Not Arbitrate

Prospects seemed remote on May 13 for the early resumption of service on the Scranton, Montrose & Binghamton Railroad, Scranton, Pa., shut down since April 18. Union officials were still firm then in their stand not to permit the employees to accept a cut in wages or permit the working conditions to be modified except by arbitration. The railroad management was equally firm in its stand not to arbitrate a matter where the possibility existed of it not being able to carry out the arbitration decision. The line runs between Lake Winola and Montrose, Pa.

Failure to agree with the employees over a new contract for wages and working conditions forced the company to suspend service. The company made a contract in 1916 with its trainmen for four years, at a maximum of 30 cents an hour, but voluntarily increased wages each succeeding year, granting two advances in 1920, so that the trainmen in April, 1920, were receiving 60 cents an hour, with other employees paid in proportion.

Shortly before the April, 1921, agreement expired the operating statements of the company were placed before a committee of the employees for their consideration. They showed that the company was fast losing money with wages taking 68 per cent of the revenue. Accordingly the men were asked to take a reduction of 25 per cent. This proposal they flatly rejected.

In a final effort to reach an adjustment the company suggested a 12½ per cent reduction in wages and modification of the working agreement so the company could use one-man cars wherever the management thought it practical.

The company stipulated that if anything were made above fixed charges during the year of the contract, the sum so earned would be applied in the form of an additional wage payment, thus cutting down the 12½ per cent wage reduction. This plan was also rejected, but by a small majority vote.

The men wanted the whole matter arbitrated. This the company has refused to do. The villages along the road have been hard hit, as they depended upon the power plant of the railroad for lighting and power, but an agreement has been made with the power-house men to work at the old scale and the consumers have submitted to an increase of 40 per cent in rates to meet the extra expense which is entailed.

Indeterminate Grants to Be Accepted

The Citizens Gas Company and the Indianapolis Street Railway are preparing to surrender their franchises granted by the city of Indianapolis and operate under indeterminate permits granted by the Public Service Commission, it is understood at the office of the commission. The railway franchise provides for the sale of six tickets for 25 cents, but its provisions have been set aside by the commission, under the emergency relief section of the public utility law.

The Legislature of 1921 authorized utilities operating under franchises from cities to surrender the franchise and operate under the 1913 act creating the State Public Service Commission. Under a section of the 1913 law, any public utility under an emergency can be operated during the emergency under the commission regardless of its franchise. It is under this section that the gas company and the railway are operating temporarily.

Program of Meeting

Pennsylvania Street Railway Association

The Pennsylvania Street Railway Association will hold its annual meeting at the Penn-Harris Hotel, Harrisburg, Pa., on June 16 and 17. One of the prominent speakers will be P. H. Gadsden, president of the American Electric Railway Association. Topics that are of vital interest to the industry will be touched on, such as Financing, Handling of Materials and Supplies, and a paper from an official of the Pennsylvania State Chamber of Commerce on the Value of Co-ordination and Friendly Relations Between the Merchant, Street Railway and General Public.

Details of Detroit United Wage Reduction

Final agreement having been reached between the Detroit United Railway and representatives of the platform employees regarding the wage reductions, notices have been posted by the company stating the change in rates of pay effective on May 1, as affecting motormen and conductors. The rates of pay made retroactive from May 1 for motormen and conductors in passenger and freight service are: 55 cents an hour for the first three months; 58 cents an hour for the next nine months, and 60 cents an hour thereafter.

Regular motormen and conductors will be paid time and one-quarter for extra or tripper work on week days. Time and one-half will be paid for extra or tripper work for Sundays or holidays, and also for the time in runs in excess of eight hours on Sundays and holidays.

The time intervening between the completion of regular runs and the starting time of extra or tripper work will be paid for at the regular rate of pay, when such intervening time does not exceed five hours. The limit of five hours thereby established for the time intervening is not to apply to men operating day runs.

A minimum guarantee of two hours at the overtime rate will be paid night men when they are required to report for and operate an a.m. tripper in addition to their regular run.

Extra men when required to operate tripper or do extra work after the completion of a regular scheduled run will be paid time and one-quarter for such extra service.

Freight men will be paid time and one-quarter for extra service and for the time in the runs above eleven hours on week days, and time and one-half when required to work in passenger service on Sundays and holidays, except where such service is performed for the purpose of allowing men regularly assigned in the passenger service to be relived from Sunday duty; and at their regular rate of pay for the time intervening between the completion of their regular run and the starting time of the extra or tripper work.

Penalties for scheduled swing runs will be as follows: For the fourteenth hour, fifteen minutes; for the fifteenth hour, an additional fifteen minutes; and for each consecutive hour thereafter an additional thirty minutes.

Employees on the Port Huron, Mt. Clemens and Ann Arbor city lines will receive 2 cents an hour less than the rate for the other Detroit United Railway platform employees.

Wage Cut in Dubuque.—Trainmen of the Dubuque (Ia.) Electric Company have had their wages reduced from 60 cents an hour to 45 cents. The company recently decided to cut wages and lower rates as a readjustment measure. The trainmen remained at work, but referred the reduction to their officers for consideration.

New York State Arbitration to Begin

The arbitration board in the New York State Railways wage dispute with its employees of Utica, Rochester, and Syracuse will begin sessions at Rochester on May 23. The arbitration board will be composed of Judge Arthur E. Sutherland, of Rochester, choice of both factions as neutral members of the board; B. E. Tilton, vice-president of railway, company arbitrator, and James H. Vahey, Amalgamated counsel, arbitrator for the union employees.

The big issues before the board will be the decision of whether the men shall accept a wage cut averaging 25 per cent and will also work more hours than nine, which is their present working day.

Details as to overtime wages are also to be worked out. The new wage agreement is now in force, but any alterations made by the board will be retroactive from May 1.

Wages Reduced in New Orleans

The employees of the New Orleans Railway & Light Company, New Orleans, La., members of the Amalgamated Association, Division 194, have come to an agreement, through a committee representing them, with the receiver by which, beginning on July 1, 1921, a new scale of wages will go into effect. The new scale affects about 2,600 employees of the company. It reduces the present wages of the men, according to the character of the work performed, from 8 per cent to 25 per cent, and removes all possibility of a strike for another year, beginning April 18, 1921.

Both the employees and the company express themselves as satisfied with the arrangements. There is no change in the working conditions. It is estimated that the new wage scales will save the company from $300,000 to $500,000 annually.

Although the wage question has been adjusted little progress has been made toward settling other matters facing the company. The citizens' committee that has been opposing the increase in fare from the franchise rate of 5 cents has suspended its activities for the time being pending action by the Commission Council, after the hearing on the injunction before the United States Supreme Court. Assistant Attorney General Hall of Louisiana is now in Washington, D. C., looking after the matter.

Senator E. M. Stafford, who has taken a leading part in the agitation for lower fares, said on May 14:

> I know there is a movement on foot to establish a bus system in New Orleans, which will bring about a material reduction in the cost of transportation. As a matter of fact, figures are being compiled from statistics gathered throughout the country. such as the cost of cars and their up-keep which will enable those directing the movement for a bus system to come to some definite conclusion. If the system is put into operation, books of tickets will be sold so as to provide for a 5-cent fare.

J. J. McLoughlin, who has been associated with Senator Stafford, knew nothing definite about the establishment of the bus system referred to by Senator Stafford, but said that discussion had been held of a plan to install a twenty-car bus system to run out St. Charles Street to either Jackson Avenue or Louisana Avenue. Beyond that, he knew nothing.

It was announced on May 15 that C. C. Chappelle, New York, representing Eastern bankers who are interested in the company at New Orleans, would arrive in New Orleans on May 16 bringing with him a new plan on which he hopes that the Commission Council and the bankers may reach an agreement.

News Notes

Arbitration in Little Rock.—Trainmen of the Little Rock Railway & Electric Company, Little Rock, Ark., have opposed the 20 per cent wage reduction proposed by the company and the dispute will be arbitrated. W. J. Terry has been selected by officials of the company and T. M. Mehaffy has been chosen to represent the men. These two men will select the third arbiter. The present contract with the men expires on May 22. This company recently applied for a 7-cent fare.

Try to Force Track Repairs.—Some of the town officials of Cicero, a suburb of Chicago, recently tried to enforce their demands upon the Chicago & West Towns Railway for track repair by barricading the right-of-way. After the cars had run through these barricades Bert Collett, general superintendent, and a supervisor and two motormen were arrested on a charge of disorderly conduct. Later steam rollers were used to block the track until a temporary injunction against the town officials was granted the traction company.

Massachusetts Commission Reports Living Costs Decrease 20 Per Cent.—The Massachusetts Commission on Necessaries of Life has recently issued a report indicating a reduction of 17.9 per cent in the average retail price of commodities as compared with peak prices during the summer of 1920. The report cites a group of commodities costing $202.60 last July as now selling for $166.40. In the case of foodstuffs the decrease is approximately one-third and clothing about 30 per cent. Fuel and rents, however, still maintain high levels.

Open Shop in Eureka.—A strike of the trainmen of the Humboldt Transit Company, Eureka, Cal., terminated recently with practically a 100 per cent non-union personnel. The men voted to strike on March 18 because some members had been discharged for violation of rules. The company refused to arbitrate and mustered about 50 per cent of crews the morning of March 19 and in twenty days all cars were operated. For several years past the city of Eureka has been about 90 per cent union. It is stated now that about 60 per cent of the business people have been converted to the open shop plan.

Valuation Bill Signed by Governor.—Governor Miller of New York on April 27 signed the Knight bil amending the law under which the Transit Commission in New York City was created, so as to make the earning ability of traction companies at the rate of fare to which they are limited by contract or franchise stipulations a determining factor in valuation. The act also brings suburban and interurban transit lines operating within New York City under the jurisdiction of the new Transit Commission. The terms of the measure were reviewed at length in the ELECTRIC RAILWAY JOURNAL for April 23, page 786.

Committee to Examine Pittsburgh Situation.—The Pittsburgh Chamber of Commerce has notified the City Council of the appointment of a special committee to study the electric railway situation in Pittsburgh and report on the best solution of any difficulties that may be found to exist. The committee is composed of Samuel Harden Church, president of the board of directors of the Carnegie Institute; George S. Davison, president of the Gulf Refining Company; T. P. Gaylord, acting vice-president of the Westinghouse Electric & Manufacturing Company; A. J. Logan, president of the A. J. Logan Company, and Lawrence E. Sands, president of the First National Bank.

City May Test New Minnesota Act.—According to City Attorney Nelson of St. Paul, Minn., legal action will be taken to test the validity of the bill passed by the recent Legislature putting control of street railway lines under the Railroad & Warehouse Commission. Formal objection by the city will not be made, however, until the St. Paul City Railway takes steps to secure authorization from the commission for issuance of further securities or to obtain an increase in fares. A digest of the provisions of the new law was published in the ELECTRIC RAILWAY JOURNAL for April 30, page 82.

Council Opposed to Wage or Fare Change.—The City Council of Sioux City, Iowa, decided in effect to reject the demands of the Sioux City Service Company for an increase in fares, and through Mayor Wallace M. Short issued a statement saying that the Council is "willing to let" the present arrangement continue in effect. That arrangement provides for a 6-cent fare for a period of three years from September, 1920. The Council also stated that it expects the Service company to make no cut in the present wage scale of employees. This probably will mean the starting of an action in court on the part of the Service company to bring about an increase in fare to either 8 or 10 cents.

Financial and Corporate

$3,675,050 Increase in Gross

Economies Put Into Effect by Receivers at St. Louis Reflected in Earnings —Fare Collections Better

An outstanding feature of the 1920 annual report of the United Railways, St. Louis, issued recently by Rolla Wells, receiver, is that $500,000 of the increased revenue was due to better fare collections.

Better care in fare collection methods are ascribed by Colonel Albert T. Perkins, manager for the receiver, to the employment of additional car auditors—28 instead of 19—the use of fare boxes, and the weeding out of dishonest conductors. More than 200 men have so far been discharged. At first the union insisted upon arbitration, but after most of the cases had been lost arbitration practically ceased.

Signs carried in the light-box space on the front platforms of cars request passengers to deposit their own fares, and also inform them that "conductors are not permitted to deposit fares except under unavoidable conditions." The public is being convinced that car service nowadays is practically on a cost basis, and that diverted fares have a direct bearing on the rates of fare. Of collections, the report says:

> In the Spring of 1920 the Public Service Commission ordered the Receiver to put into effect on April 11, 1920, a flat fare of 7 cents for adults and a flat fare of 3 cents for children; these rates taking the place of previous cash fare rates of 8 cents for adults and 4 cents for children, combined with the sale of two adult tickets for 15 cents (sold on the cars) and 7 tickets for 50 cents and 50 tickets for $3.50 (sold at stations all over the City), and the sale of children's tickets 2 for 7 cents.
>
> The result of this order was to reduce the average rate of fare by 0.37 cent—cutting down the earnings $3,000 per day. This great loss was not offset by any material benefit to the public, as the difference had been borne largely by the casual rider who paid cash or by passengers who were not interested enough to buy 7-cent tickets.

The comparative income and expense statement shows gross operating revenue for 1920 to have been $20,267,730, as against $16,592,679 for 1919, an increase of $3,675,051. The total operating expenses, depreciation and taxes were $16,712,143, as against $14,303,639, an increase of $2,408,504. The net income for 1920 was $1,083,428, as against a deficit of $265,781 in 1919, an increase of $1,349,209.

From Jan. 1 to April 11, 1920, the United Railways cash fare for adults was 8 cents or two tickets for 15 cents (sold on the cars) and 4 cents for children. Tickets in lots of seven for 50 cents and 50 for $3.50 were sold at stations all over the city. Children's tickets were sold on the cars two for 7 cents. On April 11 the basic rate of fare was reduced to 7 cents and to 3 cents for children.

After the rate of fare had been reduced wages went up. The previous wage agreement expired June 1, 1920, and the State Public Service Commission, acting as arbitrator, raised the wages of motormen and conductors 5 cents an hour. This made the scale 55 cents for the first six months, then 60 cents an hour to the end of the second year, and 65 cents an hour for those who have served more than two years, the latter class including about 80 per cent of the employees.

This increase in trainmen's wages cost the receiver about $2,000 a day. No increase was granted to mechanics, carpenters, electricians, printers and members of other unions, but the matter was submitted to the State Public Service Commission for arbitration. The commission held, however, it was not mandatory that they should act as arbitrators. The receiver recently filed a mandamus suit in the Missouri Supreme Court to compel the commission to act, alleging that the commission alone has the right to adjust income and expenses. A decision is expected soon.

The total number of revenue passengers carried in 1920 was 287,405,837 and transfer passengers 154,464,735, total 441,870,572, as against 409,010,329 in 1919. The percentage of revenue passengers using transfers in 1920 was 53.74, while in 1919 it was 53.29.

Direct taxes applicable to railways for 1920 were 7.09 per cent of the operating revenue. In addition to these taxes, the United Railways expended during the year $318,238 for street paving and furnished free transportation for police and firemen. The total taxes and street paving costs—$1,785,044—amounted to 0.621 cents per revenue passenger. Injuries and damages for the year entailed an expense of $1,216,064, or approximately 6 per cent of the gross revenue.

Capital expenditures made during the year included $60,555 for way and structures, and $448,554 for equipment, a total of $509,109, the largest items of which were $303,292 for revenue cars and $129,551 for new electric equipment for old cars. During the year 0.1253 miles of track were added, and 0.9828 removed. Track reconstruction totaled 26.50 miles. The total mileage of the system now is, in single tracks, 345.20 of city lines, and 115.52 of county lines, a total of 460.72 miles.

Power for the year costs $2,198,861, or at the rate of 13.5 mills per kw.-hr. at the d.c. switchboard. On a kilowatt-hour basis 59.4 per cent of the average distribution of power was from purchased water power, 27.6 per cent from purchased steam power, and but 13 per cent generated by the company in its own plants. On the peak loads the basis was 40.8, 25.6 and 33.6 per cent respectively.

The average number of passenger cars operated daily, including Sundays, during 1920, was 1,175, as compared with 1,132 in 1919 and 1,107 in 1918. During the peak hours in some weekdays the number was as high as 1,320.

INCOME STATEMENT—UNITED RAILWAYS, ST. LOUIS

Year Ended Dec. 31	1920			1919	
Operating revenue—	Actual	Per Cent of Operating Revenue	Per Cent Increase	Actual	Per Cent Operating Revenue
Revenue from transportation:					
Passengers	$20,113,799	......	22.20	$16,463,312	......
Special cars	32,791	......	40.70	23,297	......
Express	8,244	......	*27.18*	11,323	......
Total	$20,154,834	99.443	22.10	$16,497,932	99.43
Other railway operations:					
Station and car privileges	80,000	......	18.50	67,510	......
Rent of equipment	455	......	......	....	......
Rent of buildings, etc	12,800	......	40.80	9,109	......
Sale of power	19,641	......	8.10	18,128	......
Total	$112,896	0.557	19.15	$94,747	0.57
Operating revenue	$20,267,730	100.00	22.15	$16,592,679	100.00
Operating expenses:					
Way and structures	$1,233,332	6.085	5.50	$1,170,045	7.05
Equipment	1,606,497	7.926	3.90	1,545,241	9.31
Depreciation reserves	1,626,888	8.027	*1.95*	1,659,268	10.00
Power	2,198,861	10.849	28.20	1,715,604	10.34
Traffic	12,775	0.63	95.00	6,550	.04
Transportation	6,615,316	32.640	23.20	5,363,205	32.32
General miscellaneous	765,074	3.775	3.80	737,254	4.44
Injuries and damages reserves	1,216,064	6.000	22.20	995,561	6.00
Total operating expenses	$15,274,807	75.364	11.49	$13,292,728	79.50
Net operating revenue	4,992,923	24,636	47.20	3,399,951	20.50
Taxes	1,437,336	7.092	29.40	1,110,911	6.70
Income from operation	$3,555,587	17.543	55.30	$2,289,040	13.80
Non-operating income	145,855	.719	37.04	106,442	.64
Gross income	$3,701,442	18.262	54.50	$2,395,482	14.44
Deductions	2,618,014	12.917	1.62	2,661,263	16.04
Net corporate income	$1,083,428	5.345	509.00	*$265,781*	1.60

NOTE:—Figures in italics indicate deficit or decrease.

Reorganization Plan Being Arranged

Reorganization of the Pittsburgh (Pa.) Railways and elimination of the receivership may be effected within the next three months, according to an announcement by Mayor E. V. Babcock, following a conference with other city officials, President A. W. Thompson and chief counsel for the Philadelphia Company.

President Thompson outlined his reorganization plan but no details were made public pending the presentation of the plan to the City Council.

Louisville Results Disappointing

James P. Barnes, president of the Louisville (Ky.) Railway, made public on May 5 figures showing that the 40 per cent increase in fares by the company had resulted in an increase in earnings of only 7.49 per cent in the month of April.

In round figures, Mr. Barnes' report shows the gross revenue for the first four months of the year to be 5.09 per cent more than it was for the first four months of last year. For the two months and seven days the 7-cent fare has been in effect the earnings have been 8.56 per cent more than the same period last year. During April just past, the receipts from fares were $355,085, an increase of $25,781 or 7.49 per cent over April, 1920.

Mr. Barnes said he hoped the percentage would be increased and believed it would be as people became more used to the 7-cent fare, but that while the company was not discouraged by results to date, the increase in revenue under the higher fare had not been as great as was anticipated.

Samuel Riddle, vice-president, said he was confident fewer persons were riding in jitneys than there were a month ago. He believed the jitneys would gradually withdraw from service owing to the cost of maintenance and inability to run on regular time schedules at 5 cents.

The 7-cent fare went into effect in Louisville on Feb. 21.

Deficit of $142,030 in Cincinnati in Four Months

Figures of the monthly report of the Cincinnati (Ohio) Traction Company for April filed with William Jerome Kuertz, Director of Street Railways, when compared with other monthly reports since January, show that although there is a deficit on hand at the end of each month, the deficits are being cut down gradually. This is with exception of the month of February, when the deficit was the largest of the year to date.

During the month of April the gross receipts from all sources totaled $775,952. The gross expenses were $806,202, leaving a deficit for the month of $30,249.

The number of fares collected during the month shows a decrease of 1,103,332, for the number collected during April, 1920. Mr. Kuertz believes that economic conditions combined with high fare are responsible for the falling off in the business of the company as compared with last year. The report states that the cost of service in April was 8.95 cents per revenue passenger, while the income was 8.61 per revenue passenger.

The total accrued deficit of the traction company to date, according to its claims, is $806,426. The city of Cincinnati dispute these figures pending a decision by the courts on their contentions that the company allowed the Ohio Traction Company and the Cincinnati Car Company to earn large profits at its expense.

The accrued deficit up to Jan. 1, 1921, which had accumulated since a former deficiency was funded under a refinancing plan, amounted to $664,395. The monthly record since then, as claimed by the company, has been as follows: January earnings, $782,921; expenses, $814,113; deficit, $31,192. February earnings, $707,502; expenses, $755,497; deficit, $47,994. March earnings, $796,418; expenses, $829,014; deficit, $32,595. April earnings, $775,952; expenses, $806,202; deficit, $30,249.

Commerce Body Would Explain Refinancing to Public

In order that the citizens of Cincinnati may have an opportunity fully to understand the provisions of the proposed refinancing of the Cincinnati (Ohio) Traction Company and the Ohio Traction Company, as being formulated, the executive committee of the Chamber of Commerce has asked Mayor John Galvin that when the plan is completed it be submitted to the Chamber of Commerce as the representative of the general public, for its consideration, before final action is taken.

Interborough Loses $877,000 in Three Months

The income statement of the Interborough Rapid Transit Company, New York, N. Y., for the three months of the current year and for the nine months ended March 31 are shown in the accompanying tables. In the month of March more revenue traffic was handled than in either January or February. Although the net income for the month shows a deficit of $187,743, it is a better showing than was made in the two preceding months. The net corporate income for the nine months ended March 31, 1921, failed by $3,560,140 to meet the cost of service, this against a deficit of $1,994,780 for the corresponding period of a year ago. Since Dec. 31, 1920, the termination of the six months' period through March 31 the end of the nine months period the Interborough's deficit has increased $877,379.

Nine months ended March 31:	1921	1920	Per Cent Change
Gross operating revenue	$41,189,134	$37,989,848	8.4
Operating expenses	27,211,821	23,503,599	15.8
Net operating revenue	$13,977,313	$14,486,249	*3.5*
Total taxes	2,028,258	1,958,899	3.6
Income from operation	$11,949,055	$12,527,350	*4.6*
Non-operating income	472,881	422,848	11.9
Gross income	$12,421,936	$12,950,198	*4.1*
Interest, rentals, etc., including Manhattan Guarantee	15,982,076	14,944,978	6.9
Net Corporate income (exclusive of accruals under the provisions of Contract No. 3 and related Certificates which under these agreements with the City are payable from future earnings)	*$3,560,140*	*$1,994,780*	78.5
Operating per cent	66.0	61.8	4.2
Passengers carried (revenue)	756,977,274	702,981,440	7.7

STATEMENT OF EARNINGS—INTERBOROUGH RAPID TRANSIT COMPANY

Month Ended	March 1921	March 1920	March Per Cent Change	Feb. 1921	Feb. 1920	Feb. Per Cent Change	Jan. 1921	Jan. 1920	Jan. Per Cent Change
Gross operating revenue	$4,933,632	$4,876,561	1.2	$4,345,109	$4,468,923	*2.8*	$4,940,995	$4,444,137	11.2
Operating expenses	3,147,783	2,829,713	11.3	2,839,513	2,643,978	7.4	3,190,225	2,854,687	11.8
Net operating revenue	$1,785,848	$2,046,848	*12.8*	$1,505,596	$1,824,944	*17.5*	$1,750,770	$1,589,450	10.2
Total taxes	244,544	228,812	6.9	230,790	215,931	6.9	241,654	216,638	11.6
Income from operation	$1,541,304	$1,818,035	*15.2*	$1,274,805	$1,609,013	*20.8*	$1,509,116	$1,372,811	9.9
Non-operating income	51,892	50,426	2.9	50,613	49,446	2.4	54,122	51,046	6.0
Gross income	$1,593,196	$1,868,462	*14.7*	$1,325,418	$1,658,460	*20.1*	$1,563,238	$1,423,857	9.8
Interest, rentals, etc., including Manhattan Guarantee	1,780,940	1,674,975	6.3	1,789,213	1,673,620	6.9	1,789,079	1,676,596	6.7
Net corporate income (exclusive of accruals under the provisions of Contract No. 3 and related certificate, which under these agreements with the city are payable from future earnings)	*$187,743*	$193,486	*197.0*	*$463,795*	*$15,160*	*2,958.0*	*$225,841*	*$252,738*	10.6
Operating ratio	63.8	58.0	5.8	65.4	59.2	6.2	64.6	64.2	0.4
Passengers carried (revenue)	91,727,683	91,297,336	0.5	80,092,357	84,193,107	*4.9*	88,561,712	82,094,063	7.9

Commission Urged to Indicate Valuation Procedure

The city of Minneapolis, Minn., is very anxious that the Minneapolis (Minn.) Street Railway proceed with extensions and with reconstruction on account of paving. It is impossible for the company to attempt this work, however, without being able to stabilize financing, not only for this year but for some years in advance, in order to lay out a constructive program which will properly serve the public. For this reason it has appealed to the State Railroad & Warehouse Commission, under the recently amended law, to "advise us in what form to make application to your honorable body to undertake as soon as possible the valuation of our property that you may be able to authorize the issuance of securities which we can market to secure the money for the improvements which are being called for."

The company explains that it does not wish to press this matter too strongly, but that it does wish to have it understood that "the public improvements which are demanded are dependent upon your action in the matter."

The same request for information was made for the St. Paul City Railway, while the Duluth Street Railway requested an emergency fare of 7 cents with four tickets for 25 cents.

Foreclosure Sale of Providence Roads Ordered

Decrees for the foreclosure sale of the properties of the United Traction & Electric Company, the Rhode Island Suburban Railway, the Pawtuxet Valley Electric Street Railway, and the Cumberland Street Railway, Providence, R. I., because of the default in payment of principal and interest on the bonds, have been entered in the Superior Court at Providence by Presiding Justice Tanner.

The court appointed Arthur A. Thomas as special master in chancery to conduct the sale at such time as Mr. Thomas may hereafter announce and after six weeks' advertised notice. The roads will then probably be purchased by the joint reorganization committee for the United Electric Railway.

The decrees were entered by the court following a hearing upon the complaint of the Central Union Trust Company, New York, trustee, against the United Traction & Electric Company, and the consolidated cases of the Union Trust Company, trustee, against the Rhode Island Suburban Railway, Central Union Trust Company, New York, trustee, against the Pawtuxet Valley Electric Street Railway and the Central Union Trust Company, New York, trustee, against the Cumberland Street Railway.

The special master will put up the property in separate parts and get bids. If the sum of the highest bids for the properties separately is less than the sum offered for the three together, they will be sold together and the purchase price apportioned as provided by the decree.

Notice has also been given that the plan and agreement of reorganization of the system, referred to at length previously in the ELECTRIC RAILWAY JOURNNAL were declared operative, with respect to all the classes of securities previously mentioned, on April 23, 1921.

Merger Reported Arranged

The Capital Traction Company and the Washington Railway & Electric Company, Washington, D. C., have agreed on a plan of merger, the Public Utility Commissioners of the district announced on May 18. The details are withheld.

Court Orders Seizure of Equipment Not Paid For

Judge Martin J. Wade of the Federal court at Des Moines, Iowa, on May 13 granted an order to the General Electric Company authorizing it to seize certain equipment in the three substations and power plant of the Des Moines City Railway.

The order was to satisfy claims of the General Electric Company for equipment valued at about $68,000, which had been furnished largely for installation in the substations of the railway during the past few years. The financial condition of the railway has not permitted it to pay for the equipment. As a last resort the General Electric Company brought suit in the Federal court a few weeks ago. The order made on May 13 is the result.

F. C. Chambers, operating receiver for the railway, was in Chicago consulting with the Harris interests, owners of the Des Moines plant, at the time the order was made public, and there has been no definite announcement from the company as to just what effect the carrying out of the order would have on service.

Over the long distance telephone, however, A. W. Harris told a Des Moines newspaper that he would refuse to put another dollar into the Des Moines plant until the city and company had arrived at an agreement by which the people of Des Moines would meet the situation.

Announcement was made that the General Electric Company would start removing its equipment from the substations May 16.

In the meantime arbiters representing the railway and the union employees are deadlocked over the choice of a third arbiter. A week ago the company named B. F. Elbert, a Des Moines theater owner, as its arbiter, while Rev. J. E. Kirbye, who was the third arbiter in the last arbitration over the wage scale, was chosen by the union. Many names have been advanced for the third man without an agreement being reached.

The present working agreement between the company and men expired on March 1.

Financial News Notes

Tax Measure Excludes Electric Railways.—The King tax bill, which was recently passed by the California Legislature, as noted in the ELECTRIC RAILWAY JOURNAL, issue of March 19, page 570, does not change the rate of taxation imposed on electric railways of the state.

Bonds of Interurban Road Paid.—The $855,000 of first mortgage bonds of the Detroit & Northwestern Railway, Detroit, Mich., included in the system of the Detroit United Lines, which matured on May 1, 1921, were taken up from the present holders upon presentation to the Central Union Trust Company, New York.

Ten-Cent Fare Unremunerative.—The receipts of the Worcester (Mass.) Consolidated Street Railway were $8,230 less for April, 1921, than for the month of April, 1920, when the road operated under a 7-cent fare plan. According to General Manager Henry C. Page it was only because of the present business depression that receipts fell off.

May Buy Railway Property.—It is said that negotiations have been under way for the sale of the Gadsden, Bellevue & Lookout Mountain Railway by the Alabama Power Company which operates the city railway system in Gadsden. The Mountain Railway, as it is called, connects Gadsden and Noccalula Falls. It is expected that if controlled by the Alabama Power Company a park movement in the vicinity of the Falls will be fostered.

Service Resumed at Holyoke.—Service on the Holyoke (Mass.) Street Railways lines between Chicopee Falls and Holyoke, suspended thirty-seven days ago because of jitney competition, was resumed on May 4 following action of the Holyoke Board of Aldermen in banning jitneys from that city. The railway refused to operate its cars in competition with the buses and the Chicopee Aldermen refused to revoke permits. The controversy has been settled by the action of the Holyoke Aldermen.

Receiver for Shuttle Line.—George C. Dunlap has been appointed receiver of the Dallas (Tex.) Standard Traction Company, owner of the Mt. Auburn-Parkview line in an order signed by Judge W. S. Whitehurst. Judge Whitehurst's order further restrained the sale of the property by the sheriff on May 3, as was ordered in a previous judgment. The Dallas Standard Traction Company controls a shuttle line in the city of Dallas about 1½ miles long which was operated under lease by the Dallas Railway until May 1, when the contract between the companies expired.

Traffic and Transportation

Knoxville Decision Expected

Rumor Says Seven-Cent Fare Will Be Granted but Transfer Charge Refused

With the appraisal figures fixed and arguments heard as to the merits of the petition for higher fare, the Tennessee Public Utilities Commission is expected to render a decision within the next ten days as to whether the Knoxville Railway & Light Company of Knoxville, Tenn., may charge a 7-cent fare, with 2 cents additional for transfers, or whether the fare shall remain as it is, 5 cents.

The commission rendered a compromise decision on the appraisal of the property of the company, fixing the valuation at $5,983,000. Upon this valuation the commission will hold as to whether or not the company is entitled to a higher fare.

The appraisal of the property followed an order made by the state commission on May 21, 1920, following an application by the traction company for an increase in fare. The appraisal was concurred in by the valuation expert for the traction company. The two men fixed the valuation of the property at $6,234,141, on an historical basis, including superseded property. Of this amount the traction department was valued at $4,203,247 and the commercial lighting department was appraised at $2,030,894.

On a reproduction cost basis, using prices for the first six months of 1920, it was found by the appraisers representing the commission and the company that the value of the property would be $10,362,964.

The engineer representing the city of Knoxville, which is fighting the increase, demurred from the finding of the other two appraisers and refused to sign the majority report. He held that the property value was approximately $2,000,000 under the majority report.

Attorneys for the city of Knoxville have announced that they propose to carry the matter to a higher authority in the event the decision is against them.

Indications were on May 16, although without official authority, that the commission will grant the 7-cent fare requested, but that the request for 2 cents additional for each transfer will be denied.

Another Auxiliary Auto Service

The Holyoke (Mass.) Street Railway, through its president, L. D. Pellissier, has applied for permission from the Aldermen to run autos on the so-called West Dwight Street line. The company seeks permission to run two buses with a capacity of 30 passengers each. They will be operated under the same ordinance on which the street cars are operated, which fixes a minimum period of service.

As the West Dwight Street line, if the petition is granted, will require two shifts of men, and as union men will be employed upon it, the jitneys will be operated at both earlier and at later hours than under the old system. An attempt will also be made so to arrange the time of their running as to stagger the service and greatly increase accommodations from down town to Pleasant Street, West Dwight Street and adjacent sections.

Court Asked to Reopen Galveston Fare Case

The fare case at Galveston, Tex., has been reopened in federal court, and another legal contest is in prospect. This case was recently decided by Judge J. C. Hutcheson of the United States Court for the Southern District of Texas at Houston in a ruling adverse to the railway, when the court held the earnings of the Galveston Electric Company under a 5-cent fare were adequate and declined to permit an increase in rates.

Following arguments on a motion for rehearing Judge Hutcheson announced that he would appoint a special engineer to investigate costs of maintenance and depreciation, unless opposing counsel can agree on certain points involving these questions. Judge Hutcheson intimated that if appointment of such an engineer became necessary, he would be representative of the court and not of either of the parties to the litigation.

Judge Hutcheson's decision holding that the earnings of the company under the present fare charges are adequate was made after a special master in chancery had conducted hearings and had investigated fully the questions of maintenance costs, depreciation, valuation, etc. Judge Hutcheson, however, held adversely to the findings of the special master, Judge Henry J. Dannenbaum, Houston, who found, according to his report, that the Galveston Electric Company can not make a fair and just return on its investment with fares at 5 cents.

The new developments in the case in the motion for rehearing, on the ground that additional evidence is to be presented, is regarded as assuring a reopening of the case. The motion for rehearing, filed by attorneys for the company, alleges that the court erred in deciding against the company on grade raising, depreciation, brokerage, going-concern value, and the court's treatment of operating expenses and maintenance.

Seven-Cent Fare Voted Down in Port Huron

The electors of the city of Port Huron, Mich., voted down the proposition of the Detroit United Railway to increase fares on the Port Huron city lines, which are part of the Detroit United System, from 5 cents to 7 cents, at the April 4 election. The company's proposal was defeated by a vote of 3,200 to 2,026.

As a result of the failure of the proposed increase to carry, wage reductions affecting the employees of these lines were announced by the company to become effective on May 1. The new wage scale proposed by the company calls for rates 2 cents an hour less than the proposed scale for Detroit employees, or 53, 56 and 58 cents an hour.

The State Railroad Commission did not have jurisdiction in the Port Huron case. The proposed increase of fares there would have amounted to a suspension of franchise rights similar to the case when the Detroit City Council granted the company an increase of fares in Detroit even though the rate was fixed at less in the franchise agreements. In the case of the Port Huron Council, the city officials simply refused to act and put the matter of the increased fare up to the voters in referendum. No further action has been taken by the company in as much as the decreased scale of wages on the Port Huron lines went into effect on May 1.

Application for Eight-Cent Fare Dismissed

The Corporation Commission of North Carolina has, upon motion of the Asheville Power & Light Company, Asheville, N. C., dismissed the application of that company for an 8-cent fare in the city of Asheville. In asking for the dismissal of the 8-cent fare case the company applied for authority to increase its gas rates and a date has been set for a hearing on this last application.

It is understood that the action of the company in respect to the railway fare was influenced very largely by conditions prevailing on its gas property, where the need of improvements was great and the earnings from the present gas rates were insufficient to justify additional expenditures. Faced with the necessity of increasing its gas rates in order to furnish adequate service the company was disinclined to inaugurate both higher gas rates and railway fares at the same time, and therefore decided to ask for the dismissal of the railway application with the idea of adhering to the present 6-cent fare if future conditions make this possible.

While the present 6-cent fare is said not to yield a fair return upon the value of the property it is the intention of the company to give this a further trial in the hope that, Asheville being a resort city, the approaching tourist season will bring with it sufficient business to justify the action taken.

Increase Disappointing

Indianapolis Roads Willing to Assume $1,000,000 Construction Cost for Freight Terminal

Joseph A. McGowan, treasurer of the Indianapolis (Ind.) Street Railway, and attorneys for the company, who appeared before the Indiana Public Service Commission on May 12 concerning the 6-cent fare and 1-cent transfer charge, filed with the commission a document that shows that the four big interurban companies that enter Indianapolis are willing to assume the cost of constructing the $1,000,000 freight terminal which is proposed on Kentucky Avenue.

FINANCING A PROBLEM

At the present time the officials of the Union Traction Company, the Terre Haute, Indianapolis & Eastern, the Interstate Public Service Company and the Indianapolis & Cincinnati Traction Company are concerning themselves with financing the proposition. In the meantime plans for the construction are progressing with the engineers. It is thought here that there will be no opposition on the part of the Public Service Commission to the proposed construction. Under existing franchises the Indianapolis Street Railway is supposed to provide the interurban companies with freight room, but officials of the interurbans know from the present earning power of the local company that it could not possibly handle such a proposition.

The first move toward the project will be the organization of a separate company as a holding company for the freight project. Stock will be issued, twice as much preferred as common. The common will be held by the four interurban companies and the preferred will be sold. It is the intention to distribute the stock over the entire State where the various interurban companies operate.

John W. McCardle, chairman of the commission, said recently the commission had not decided on the course it will follow in the case of the Indianapolis Street Railway. It may hold a supplemental hearing and issue a new order before the end of the thirty-day period. On the other hand, it may merely issue an order continuing the present fare schedule until June 1, and in the interval hold the supplemental hearing and then issue a new fare schedule order.

697,055 FEWER PASSENGERS

In response to the commission's request, officers of the railway and city officials considered with the company recently the receipts of the railway under the temporary order. The figures were compared with the receipts for the corresponding period last year. Company officers submitted that in April the company carried 697,055 fewer passengers than in April, 1920. General business depression and jitney bus competition were given as some of the reasons.

Mr. McGowan said that if the same rates of decrease prevailed through the remainder of the year the company would lose $445,000. He showed that of the 3,153,306 passengers carried in April, 1,041,491, or 31.72 per cent, paid the 6-cent cash fare, and the remaining 2,111,815 passengers bought tickets. It was estimated by some, when the commission heard the petition for the present charges, that if passenger business did not fall below that of last year and if 15 per cent of the passengers paid the extra cent, the company would obtain revenue sufficient to keep it going. The experience of the company in the trial period shows that while more than twice that percentage paid the extra 1 cent, the total number of passengers, and consequently the total revenue, fell far below that for the corresponding period last year.

Robert I. Todd, president of the company, and Ferdinand Winter, its attorney, discussed jitney bus competition. George M. Bernard, a member of the commission, requested the officers to produce at the supplemental hearing figures to show the injury done to the company by the jitneys.

Arthur W. Brady, president of the Union Traction Company of Indiana, and Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, filed a petition with the commission requesting approval of a freight terminal arrangement between the city railway and the interurbans using city tracks. The arrangements were made public some time ago. The interurbans request authority to make a special terminal charge of 3 cents a 100 lb. for freight and express.

City After Detroit United Again

Steps leading to the possible reduction of Detroit city fares to 5 cents have been taken by the city officials. A resolution prepared by Councilman Watson directs the Corporation Counsel to advise the Council relative to the proper legal step to take to have the fare lowered. The company has been asked to submit operating figures so that the city can determine whether or not the reductions in the wages of platform employees will allow a reduction in fares.

The fare on Detroit city lines was increased to 6 cents with nine tickets for 50 cents last June by an agreement between the company and the city. The city officials maintain that the increased revenue provided for by the increased fares was to be used to pay increases to motormen and conductors only. The company maintains that other employees were included.

According to the figures of the city's accountants who have audited the company's books in accordance with the agreement when the increased fare was granted, a surplus income had been accumulated up to the end of February, due to the increased fares, in excess of the amount required to pay increases to all employees.

Omaha Hearing Begun

Deficit Under Temporary Seven-Cent Operation—Valuation Figures Presented

The hearing on the application of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for a permanent rate, before the State Railway Commission, was scheduled to begin in the Omaha City Council chamber on May 16. The company is not asking for any specific rate of fare, but demands a rate that will yield a reasonable return on its investment.

The commission issued a temporary rate order effective on Aug. 10, 1919, allowing the company to charge 7 cents for cash fares, with a four-for-a-quarter ticket privilege. In connection with that order the company was directed to file with the commission a physical valuation report. This has just been done.

A copy of this valuation report was handed to W. C. Lambert, corporation counsel, who will represent the city at the hearing. In this report the company sets up the following valuation figures: Reproduction cost new of physical property, based on a four-year average to 1919, $17,316,833; on 1919 basis, $19,671,741; allowing for depreciation, as of 1919, $17,890,765. The following valuation totals include organization and legal expenses, interest and taxes and going value: Reproduction cost new on a four-year average, $21,740,254; for 1919, $25,126,177; allowing for depreciation, as of 1919, $23,291,772.

The company's gross earnings from operations in 1920 were $4,807,529. A deficit of $81,586 is shown for that year. Interest on bonds paid last year, $479,212; taxes, $427,861; 6¼ per cent dividends on preferred stock, $250,000. No dividends were paid on the common stock during 1920. The report further shows a surplus of $16,829, for 1919. The total number of passengers carried during 1919 was 70,151,302, and during 1920, 72,033,229. The property account shows 1,142 motors, 119 miles of main track and 2 miles of leased track.

Court Sustains Denial of Ten-Cent Fare

The Jersey Central Traction Company failed to comply with an order of the Board of Public Utility Commissioners that it provide "proper and safe" service for its patrons. This is the conclusion of Justice Kalisch in an opinion filed in the New Jersey Supreme Court on May 5 in which the court affirmed a decision of the Utility Commission denying an application for permission to establish a 10-cent fare. The company operates in Perth Amboy, South Amboy, Sayreville, Matawan, Keyport, Keansburg, Red Bank, Atlantic Highlands and other municipalities in Middlesex and Monmouth counties. In 1918 the company charged 5 cents in each fare zone, but war conditions prompted the Utility Commission to advance rates to 7 cents. A further increase to 10 cents was sought in an application to the commission in April, 1920, but the company failed to comply with an order to improve service and the plea was denied. It then appealed to the courts. Justice Swayze in the lower court in sustaining the decision by the Utility Commission, said that the evidence showed the service to be insufficient, inadequate and unsafe.

Hearing on Fort Wayne Fares

At a hearing conducted by the Indiana Public Service Commission at Fort Wayne, on the request of the city of Fort Wayne that the Indiana Service Corporation be forced to reduce the price of city fares from 7 cents cash and four tickets for a quarter, it developed that the company's business is 20 per cent less than what it was last year at this time.

The city attorney claimed that more cars are now being operated than are necessary and that if the number of cars operated was reduced the fare could be decreased. The local federation of labor sent a letter to the commission asking that five tickets be sold for a quarter and that the cash fare be adjusted to 8, 9 or 10 cents or whatever figure was necessaray to get the required revenue.

Previous to the hearing the company published a large advertisement in the local newspapers which read in part as follows:

> The record of the operating expenses and revenues of the company which were checked by both the city and state accountants during investigations for the past four years, show that the following return was earned on the investment of the company: 1917, 1.38 per cent; 1918, 0.83 per cent; 1919, 2.92 per cent; 1920, 7.27 per cent; average for four years 3.3 per cent.
>
> After taking away bond interest from the investors for almost three years and pouring it back into the property for new cars and track improvements, the company during 1920 was able to earn 7.27 per cent. But remember that a public utility company is not like the ordinary industrial corporation which has a chance to build up a surplus from revenues during prosperous times to carry it over the bad years.
>
> This company has earned far less than a fair return for the past four years and even at the present time is not earning 8 per cent, which is the minimum cost of public utility money. Remember even city bonds are selling to yield 6 per cent.
>
> The company believes that its patrons in Fort Wayne want real service first and that they are willing to pay the fair cost of this service. No one has contested the fact that the company is trying to give real service and pay decent wages.
>
> The company is just as anxious to reduce fares as is the rest of the community to have it do so, but they know that fares cannot be reduced without materially curtailing the service. Fares were not raised as early as they should have been and the 5-cent fare and the six-for-a-quarter ticket was not a self-supporting fare at any time during the past ten or twelve years.
>
> The company believes that a well maintained street railway giving real service is what the patrons want in Fort Wayne. You can have whatever kind of service you are willing to pay for.

The matter of equipment betterments was gone into extensively. Mr. Feustel stated that while it appeared that the company was doing a great deal of repair and construction work, in reality less was being done than was necessary to keep the plant and tracks in good repair and he stated that the increase of 70 per cent in the cost of construction made the figures look large.

Utility Commissions' Joint Attack on Wheeling Ruling

Formal attack on the decision of the Interstate Commerce Commission authorizing the Wheeling (W. Va.) Traction Company, operating an electric interurban railway in Ohio and West Virginia, to advance intrastate passenger fares in Ohio to its interstate level of rates was made on May 8 by the National Association of Railway & Utility Commissioners in a motion filed with the Interstate Commerce Commission asking a rehearing of the case and permission to intervene therein.

In the motion the National Association said in part:

> The several state railroad and public utilities commissions, on behalf of which this motion is filed, are interested in this proceeding by reason of their desire to preserve their jurisdiction to serve the people of their states in the manner provided by their laws. If the order of the commission in this case shall stand, and if this commission shall exercise, or attempt to exercise, power to make like orders in other cases falling within the precedent thereby etablished, said commissions will be largely deprived of their jurisdiction over street railroads, or will be compelled to engage in a multiplicity of suits to defend the same.
>
> The purpose of this motion is to secure a review by this commission of the order which has been made herein, and of the findings of fact and rulings of law upon which said order rests, to the end that said order may be set aside, and this proceeding disposed of without encroachment upon the regulatory jurisdiction and power of the State of Ohio, exercised through the commission and the municipalities of that state.
>
> There is no disguise of the fact that this is a carrier proceeding, designed to bring about an increase of intrastate fares for the purpose of producing larger revenue for the Traction Company, regarded as an interstate carrier. The record was made upon the theory that rates which the commission deems unreasonably low may be found discriminatory against interstate commerce. The case was presented to the commission upon that theory, and decided on that theory. There is no evidence of discrimination of any other sort.
>
> We maintain that this commission ought to rule that Congress has conferred upon it power of supervision over street railroad rates practically by stealth, without mention of the class of carriers over which such enlarged jurisdiction was to be created, and without mention of the purpose designed in any of the proceedings which attended the passage of the act held to effect such enlargement.
>
> We point out that when the transportation act was under consideration the representatives of electric railroads stated that they did not wish to come under it. Nobody urged any extension of rate making power as to them. The commission requested only that if interurban railroads were to be affected by the act they be clearly defined.

The decision in the Wheeling case was reviewed in the ELECTRIC RAILWAY JOURNAL for April 23, page 789.

Private Suits Against Railway Are Halted

Until the United States Circuit Court of Appeals at Cincinnati settles the Louisville fare litigation private suits seeking to restrain the Louisville Railway from charging a 7-cent fare will be denied. Judge Evans has ruled that the city is the proper defendant and can protect the rights of all people interested in defense of this action. In a suit pending in the Quarterly Court Reuben Ruthenberg, attorney, seeks to sue for himself and others similarly situated to recover from the railway the entire amount paid by patrons in fares in excess of 5 cents since the increase of 2 cents became effective. Should the final decision in the United States Court be unfavorable to the railway and Mr. Ruthenburg's motion be sustained in the Quarterly Court all those who are seeking to recover excess fare amounts will have to join in one petition. The company has been using rebate slips and the Federal Court will provide the method by which the rebates shall be made to the holders of slips so no action will be necessary in the state or county courts for a refund.

Commission Wants Cities to Indicate Desirable Jitney Routes

Suggestion that officials of cities prepare a schedule of routes desirable for jitney travel in preference to having individual jitney men make application for the right to traverse this or that route is made by the Public Utilities Commission of Connecticut through its secretary in a communication to the Manufacturers' Association of Bridgeport relative to the future status of the buses.

The communication indicates that Bridgeport will be permitted to solve its own jitney problem, and it will practically lie within the power of municipal authorities of Bridgeport to recommend what jitney service shall be continued in order to serve the people of the city. It is further indicated that New Haven officials may similarly recommend if they so desire.

The commission in this letter says that if the local authorities, who should be familiar with existing street railway service and local requirements, would lay out such routes it would materially assist the commission and have a tendency to simplify and systematize the whole situation; and further, that after establishment of routes, the individual application to operate over any such routes could be received and acted upon without involving the question of public convenience and necessity.

The letter says:

> The law specifically requires that a public hearing be given on each application for a certificate to operate a jitney and that no such certificate be given without a finding of public convenience and necessity. The law is not specific, however, as to the hearing and finding on public convenience and necessity as to the particular route or manner of establishment other than the implication that such finding be determined in each individual case. In the absence of having established any positive mode of procedure the foregoing is submitted informally as a suggestion which at this time seems the most practical course to pursue as applicable to the city of Bridgeport and vicinity. In view of the large amount of work involved all over the State in this matter it is the desire of the commission to start proceedings as early as can be conveniently arranged. The commission is having prepared a form of application for certificate to operate a jitney and same will be ready in a few days.
>
> The commission adds that it has no form for establishment or travel of routes but the same may be informal and submitted to the commission, specifying the routes and asking for a hearing and finding as to public convenience and necessity.

The jitneys were brought under the jurisdiction of the commission effective July 1 as to their convenience and necessity at the present session of the Legislature.

Transportation News Notes

Niagara Fare Advanced.—The International Railway, Buffalo, N. Y., under a joint tariff covering passenger traffic with the Niagara Gorge Railroad, effective on May 1, increased the Buffalo-Lewiston fare one way via the Falls 13 cents. The round-trip will be increased 11 cents. The Buffalo-Youngstown fare one way will be advanced 8 cents and round trip 5 cents.

Decrease in Passengers Carried.—Industrial depression and the unrestricted operation of jitneys until April are given as the reasons for the alarming decrease in traffic on the Youngstown (Ohio) Municipal Railway. In March, 1921, there was a falling off of 50,000 passengers over the previous month and about 500,000 over the corresponding month of a year ago.

Reduced Fare in Dubuque.—A reduced fare rate has recently been put into effect in Dubuque by the Dubuque (Ia.) Electric Company as part of a readjustment measure which included wage reductions. Instead of seven tickets for 50 cents formerly sold, eight tickets for 50 cents are now for sale, with the cash fare of 8 cents remaining unchanged. The increase in fares was made just a year ago.

Petitions for Seven-Cent Fare.—The Virginia Railway & Power Company, Richmond, Va., has petitioned the City Council for a 7-cent fare with the withdrawal of all labor tickets. The company is at present operating on an amended franchise fixing the fare at 6 cents. The franchise expires on Aug. 1. The petition asks that the existing franchise be amended so that the fare of 7 cents may be charged for twelve months.

Emergency Rate Asked.—The Duluth (Minn.) Street Railway has filed a petition with the State Railroad & Warehouse Commission for an emergency fare of 7 cents. The present rate is 5 cents. The increase will be asked for under a provision passed by the last state legislature which permits the commission to grant an emergency rate pending a valuation of the property. The company was unsuccessful in obtaining an increased rate from the city.

Petitions for Decrease.—The Muskogee (Okla.) Electric Traction Company recently petitioned the State Corporation Commission to put into effect a reduction of fares between points in the city of Muskogee and Hyde Park to 10 cents during the park season. The commission granted the request, stating that it was to the interest of both the public and the traction company to make the fare between these points as reasonable as possible during the summer months.

Fare Injunction Refused. — An injunction against the Cincinnati (Ohio) scale of fares has been refused the residents of Lockland and Wyoming by the Hamilton County Court of Appeals. This decision affirmed the lower court. Residents claimed that under a franchise to the Ohio Traction Company in 1900 the road agreed to carry passengers between those villages and the Zoo for 5 cents, and they sought to have that franchise kept in force. The higher and lower courts agreed that since the city owned the streets it has the right to fix the fares to be charged passengers using them for car rides.

Safety Campaign in Massachusetts.—Brigadier-General Leroy R. Sweetser, Commissioner of Labor and Industries of the Commonwealth of Massachusetts, has appointed two special safety committees, consisting of five well-known street railway men and five steam railroad men, to promote safety methods and reduce accidents among employees of the Massachusetts transportation system. The specific work laid out for these committees is to co-ordinate safety work among the various transportation agencies, adopt standard rules and regulations, and to publish bulletins for the guidance of the various properties. The street railway branch of this committee consists of H. B. Potter, Boston Elevated, chairman; G. W. Mitchell, Eastern Massachusetts Street Railway; H. R. Whitney, Springfield Street Railway; G. H. McFee, Boston & Worcester, and Chester P. Rexford of the Union Street Railway.

Receipts Barely Meet Costs in London.—In May, 1920, the Ontario Railway & Municipal Board took over the operation of the London (Ont.) Street Railway during a third strike of the employees for higher wages. The company sells nine limited and seven unlimited tickets for 25 cents under a franchise secured in 1895, and all efforts of the railway to have the fares increased to meet the present-day conditions have failed. A year ago the citizens voted down a proposed increase. Now Vice-Chairman A. B. Ingram, of the Ontario Railway & Municipal Board, announces that the receipts are barely sufficient to meet the costs of operation and the prospects for the ensuing year are rather dark. The employees have dropped their demands for more money, but the railway board finds it impossible with the existent fares to pay for the company's share of paving on streets traversed by its lines under the existing agreement with the city.

Eight Cents in Oneonta.—The Southern New York Power Corporation, operating in Oneonta, N. Y., has been authorized by the Public Service Commission, Second District, to charge for a year from April 20, and thereafter until changed by order of the commission, an 8-cent fare in place of the present 7-cent fare in the Oneonta urban zone, with seven tickets for 50 cents. Tickets need not be sold on cars if placed on sale at the company's office and at least three other accessible places in Oneonta. The company asked for a 10-cent fare. In reviewing the evidence the commissioner says the company has made out a case showing the need of a 10-cent fare but the experience of the commission shows that the imposition of such a fare may result in a decreased patronage, which would offset any advantage in amount. Even with the highest fare suggested, he says, it is apparent it will not yield the company a fair return. The fare on the "owl" cars, however, is made 10 cents.

People Must Decide on Jitney or Railway.—The City Commission of Bay City, Mich., recently received a communication from the manager of the Saginaw-Bay City Railway operating in Bay City to the effect that either the jitney or the electric railway must go as both cannot survive. He declared that traffic in the city did not warrant two systems of transportation and the increasing jitney competition had rendered successful operation of the electric property practically impossible. Some conclusive evidence was submitted showing how far behind Bay City was in the matter of railway traffic and revenue compared with other cities of a similar class. During 1920 4,099,419 revenue passengers were carried as compared with 6,291,801 in Saginaw, 7,133,370 in Lansing and 7 265,884 in Jackson, though street car service and car-hours traveled were practically the same for Bay City as for other cities of the same class. The company operated at a loss of $2,600 in January, $6,800 in February and $5,800 in March. The City Commissioners want the matter referred to the Public Service Commission.

Relief Sought for Railway.—Operation of jitneys in Houston, Tex., is costing the Houston Electric Company, which owns and operates the electric railway in that city, an average of $20,000 a month, according to representations made by W. E. Wood, vice-president and general manager, before the board of city commissioners. If the heavy drain made by the jitneys on the company's revenue continues, Mr. Wood informed the City Commission, the traction company can not carry out the proposed improvement program calling for an expenditure of $450,000. The records show that licenses for 200 jitneys have been issued and it is estimated that practically the entire number are now in operation. The City Commission has no authority to revoke licenses of jitney operators, but an ordinance is now being prepared giving the commission such authority, and its passage seems assured. It is probable that some action will be taken to afford some relief for the traction company. Jitney warfare has been going on now for some time in Houston. The situation became complicated several weeks back when the railway made the removal of its tracks from Main Street contingent on the abolishing of the jitney.

Personal Mention

Mr. Scott Advanced

Long Practical Experience in Hartford Well Fits Him to Manage That Connecticut Company Division

Nathaniel J. Scott has been appointed manager of the Hartford Division of the Connecticut Company to succeed the late Warren P. Bristol. Mr. Scott has been employed by the company in Hartford and vicinity for twenty-five years and for some time has been filling the position of assistant manager. In the appointment of Mr. Scott to this position is recognized the choice of an executive trained for the responsibility in the school of practical experience and first-hand contact with the problems of trolley management.

N. J. SCOTT

In the Connecticut Company's announcement of the appointment of Mr. Scott, it is indicated that the powers of local managers have been broadened, as was suggested recently in a special report to the Connecticut Public Utilities Commission. It says:

> The managers of the various divisions of the Connecticut Company are charged with sole responsibility for the operation of their respective divisions, and are responsible for all matters pertaining to the service and upkeep of the property. They are expected to keep fully posted as to the particular needs of the various committees, and to see that in all matters the convenience of the public is assured. They have full authority to initiate such changes as in their opinion are best suited to meet the requirements of the communities which they serve.

Mr. Scott was born forty-four years ago in the Province of Quebec, Canada. His early education was acquired there and he was graduated from the Knowlton High School. Coming to Hartford shortly thereafter, he entered the employ of the Connecticut Company in July, 1896, and has been with it continuously since. He began as a conductor and spent some five years as a platform man. Later he became carhouse foreman and was successively made dispatcher and chief clerk to the manager, rising from that place to superintendent of transportation in which capacity he served for many years until his promotion came to the position of manager.

During this period of service Mr. Scott acquired a wealth of detailed knowledge of street railway conditions, particularly as they pertain to Hartford. His familiarity with the local problems of the company's system contributes in large measure to the qualifications which earned his promotion. He is held in high esteem by all his colleagues, and his long association with the Hartford office has contributed to the best of friendly relationships.

Pioneer Railroad Builder Retires

William Hood, chief engineer of the Southern Pacific Company and one of the greatest railroad engineers in the United States, retired on May 3, according to an official announcement made by President William Sproule of the Southern Pacific. George W. Doschke, formerly assistant chief engineer, has succeeded to the position. Mr. Hood left on the fifty-fourth anniversary of his first connection with the company.

Mr. Hood left the employ of the Southern Pacific Company at the age of seventy-five years, not because of failing health or because of his age, but because he desires to attack more difficult problems than are presented by the railroads in this stage of operation when no large extensions of roads are contemplated. He prefers to labor with the difficulties of new construction and development with its attendant out-of-door activities.

Ever since he went to work for the Central Pacific in 1867, Mr. Hood has been closely identified with the work of uniting the West by steel rails. In the development of the railway system with which he has been connected he has been called upon to solve the most difficult engineering problems, and some of the feats which he has accomplished will prove lasting memorials to his ability.

Mr. Hood was born in Concord, N. H., in 1846. As he was preparing for college at the age of sixteen the Civil War broke out, in which he saw service in some of the most sanguinary conflicts of the struggle. After being mustered out of service he entered Dartmouth College where he remained until 1867. Inspired by the efforts to construct a railroad through the Rockies he left college and came to Sacramento where he obtained employment with the Central Pacific. He soon became assistant engineer and in 1875 was made chief assistant engineer.

Mr. Hood has been chief engineer of the Southern Pacific since 1885. He is intimately acquainted with every portion of the system which operates over more than 11,000 miles, having traveled on foot across almost every mile of the territory later spanned by the present tracks.

Mr. Hood has saved his company a vast amount of money in construction costs by exercising true engineering skill and evolving many clever expedients to solve knotty problems.

E. F. Eicks, Auditor of Fort Wayne-Lima Line

Edward F. Eicks, who some time ago was appointed auditor of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind., has taken charge of the accounting work of that system. His duties are separate from those of L. W. Van Bibber, auditor of the Ohio Electric Railway system, which holds and operates the former property.

E. F. EICKS

B. H. Jones is receiver of the Ohio Electric Railway system proper, while some of the other subsidiary companies have been placed under separate receivers. Such is the case of the Fort Wayne, Van Wert & Lima Traction Company, of which H. C. Paul is the receiver. It was his intention, under the general plan of receivership for the whole system, to segregate the accounts of the Fort Wayne line for operating purposes. New offices have been established at Ewing and Pearl Streets, Fort Wayne, in the building owned by the Indiana Public Service Corporation. Mr. Eicks has been placed in charge of these offices.

The receivership of the Ohio interurban system, one of the largest in the world, with its 467 miles of interurban lines and 33 miles of city lines, came several months ago as the result of a succession of unpreventable and unfortunate occurrences. The combination of high war-time costs, preceded by a tremendous property loss by flood in 1919 and followed by an ever-increasing loss of traffic from automobile competition, has precluded the possibility of meeting operating costs alone, to say nothing of allowing a return to its investors.

The latest report, under the separate management, of the interurban connecting Fort Wayne and Lima, shows an operating surplus of about $600 for the period from Jan. 26 to Feb. 28, 1921. The statement also indicates that substantial gains in earnings are being made by the other properties included in the Ohio Electric Railway receivership.

Practically all Mr. Eicks' training and experience have been along the line of cost finding and accounting, though more in connection with commercial affairs than with railways or utilities. He has handled this sort of work for branch houses of various firms for the past several years. Previous to his present appointment he was accountant for the Sherman-White Company, wholesale dealers in poultry products and owners of a large cold storage house. Mr. Eicks was a lieutenant in the 33rd Division during the war.

J. A. MacAdams has accepted the position of general manager of the Claremont (N. H.) Railway, succeeding A. C. Ralph, deceased.

J. R. Tozer, for four years power engineer of the Rutland Railway, Light & Power Company, Rutland, Vt., has resigned to accept the managership of the municipal plant at Swanton, Vt.

L. Edward Herrmann, Jersey City, general counsel for the New Jersey Board of Public Utility Commissioners, and Alfred N. Barber, secretary of the body, have been reappointed to their respective positions.

William B. Malone, the general manager for the past year of the Meridian Light & Railway Company, has left Meridian for Salina, Kan., where he will be the general manager of the Salina Light, Power & Gas Company. Mr. Malone has been succeeded as general manager by H. C. Bonner, formerly general manager of the Alliance Gas & Power Company, Alliance, Ohio.

W. O. Clure, general passenger agent for the Twin City Lines, Minneapolis, Minn., returned to his office on May 16 after an absence of several months, the result of injuries from a fall into the company's headquarters building passenger elevator shaft. The accident occurred on Labor Day. Mr. Clure has been making occasional visits to the offices for some time with the aid of crutches.

W. H. Coleman, of the Montgomery Light & Traction Company, Montgomery, Ala., succeeded on April 1 E. W. Ashmead as manager of the street car lines of the Alabama Power Company in Gadsden, Ala. Mr. Ashmead has been promoted to the commercial department of the Alabama Power Company at Birmingham. Mr. Coleman is a practical street railway man, having served mostly in the operating department of the system in Montgomery, where he has had long and varied experience in the business.

Mr. Feiker in Washington

Hoover Selects McGraw-Hill Executive as Assistant to Develop Aids to Business

F. M. Feiker, vice-president of the McGraw-Hill Company and chairman of that company's editorial board, has been appointed assistant to the Secretary of Commerce. An indefinite leave of absence from the McGraw-Hill Company has been granted to Mr. Feiker, so that in accepting the appointment he will lose only temporarily his active connection as an official of the company.

Briefly Mr. Hoover has divided the bureaus of the Department of Commerce into two parts. Assistant Secretary Huston will supervise the bureaus relating to navigation and fisheries, while Mr. Hoover will give his personal attention to the Bureaus of Foreign and Domestic Commerce, Standards and Census. Mr. Feiker will directly assist Mr. Hoover in the expansion of these bureaus as aids to business.

F. M. FEIKER

The immediate problem is to find out by means of a series of conferences with the representative men of industry what kind of facts and figures industry needs from the Government. Having organized the department to function according to requirements, the next problem is to devise an adequate system of clearing the collected data back to business. It will be apparent at once that with Mr. Feiker's background of engineering training, viewpoint on the needs of industry and sense of publicity, he will be in a position to render unusual service in the furtherance of Mr. Hoover's plans. It is Mr. Hoover's purpose to develop the Department of Commerce so that it will have the same relation to business that the Department of Agriculture now has to farming. In other words, he feels that its function is to aid industry, not to regulate or control it. Considering his intimate knowledge of foreign conditions, his masterful grasp of economic principles, and his present official position, important results should follow.

Mr. Feiker, an electrical engineer by profession, has been especially interested in aiding Mr. Hoover in the development of his plan for the elimination of waste in industry which was undertaken by the Federated American Engineering Societies at Mr. Hoover's suggestion. Mr. Feiker is a graduate of the Worcester Polytechnic Institute, class of 1904, and for several years was chairman of the editorial board of the A. W. Shaw publications of Chicago. In 1915 he succeeded Dr. A. S. McAllister as editor of *Electrical World* and in 1919 he was appointed editorial director of all the McGraw-Hill publications. Mr. Feiker has served on a number of important committees of the National Electric Light Association and in 1920 was president of the Editorial Conference of the New York Business Publishers' Association.

John E. Zimmerman, Day & Zimmerman, Philadelphia, Pa., has been elected president of the Washington-Virginia Railway, to succeed the late Howard S. Graham. Thomas Roosevelt, also of Day & Zimmerman, has been elected vice-president, succeeding R. Golden Donaldson, who resigned, but will remain as a director and member of the executive committee.

Francis H. Miller, vice-president and superintendent of maintenance of the Louisville (Ky.) Railway, was elected president of the Louisville Rotary Club at the annual meeting of the newly elected board of directors of the organization. Mr. Miller was elected from the board of directors, which elects the president and vice-president, while the other officers are elected by the general membership.

Paul A. Lazenby, who was recently elected engineer of the newly-organized Toronto Transportation Commission, gained considerable of his experience in transportation work in the United States. He is a graduate of the civil engineering course at Massachusetts Institute of Technology in the class of 1904. Mr. Lazenby spent four years in general engineering and construction work with the Chicago, Burlington & Quincy Railroad, Deadwood, S. D. After considerable experience with other roads, in 1911 he accepted a position as associate engineer with the Chicago Plan Commission and was engaged in the preparation of a city plan and in transportation studies for that commission until 1915, when he resigned to become principal assistant engineer for the Civic Transportation Committee, Toronto, which was the forerunner of the present Transportation Commission. While with the Chicago commission Mr. Lazenby assisted in the engineering work in connection with the new Pennsylvania terminal on the west side of the city. He was also associate engineer in the preparation of city plans for Brooklyn, Minneapolis and Detroit.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Easy Deliveries Feature Rope and Cord Market

Operating Companies Not Accumulating Stocks and Buying Has Not Increased—Raw Cotton Quoted Higher

A 10 per cent decrease in the prices of trolley rope and bell cord made last month with a view toward stimulating sales has so far had little effect on the market. Operating companies are not accumulating any large stocks of this material under present conditions of prompt delivery, and until present stocks are lowered considerably it seems unlikely that buying will set in on any accelerated scale. Leading manufacturers in the east report both inquiries and sales as below normal, showing practically no change from the recent small volume of transactions. Collections are slow on sales actually made, but that is not unexpected under existing world trade conditions. Spot cotton in New York shows a slight advance to 13.05 cents since last report.

Some divergence exists among manufacturers in the matter of factory stocks and deliveries. Under present conditions of restricted buying and slow payments some refuse to maintain stocks at their plants, agreeing to make as prompt deliveries as possible on orders received. Others report fairly plentiful stocks and immediate shipments on orders. Factories are operating below their capacity, although one establishment is running about six days a week, turning out electric railway and other material.

Prompt Shipments of Safety Tread Material

Some Manufacturers Report Very Little Railroad Buying, but Others Find Demand Is Increasing Satisfactorily

Uneven conditions as regards buying are reported in the market for safety floor and step treads by manufacturers. On the one hand it is reported that very few orders are being received from either steam or electric railways just now. Some manufacturers, however, state that though sales are still below normal, they are increasing satisfactorily, and at least one producer is finding the railway market for safety tread material more active at present than at any time in the past. Large orders have been received from the Pacific Coast, it is stated, and inquiries indicating a future demand are coming from the Middle West, but the market in the East remains quiet.

Raw material stocks are reported to be large, some manufacturers carrying a heavier stock at present than at any previous period. Consequently, though it is a general policy not to stock the finished product, inasmuch as each order is made to specification, orders can be filled very quickly. In general factories are able to make up material in from one to two weeks' time. Production is naturally curtailed under present market conditions, operation as low as 50 per cent of capacity being reported.

Where labor readjustments have been made in this field, prices have been reduced about 15 per cent from the peak, but in instances where war-time wages are still maintained the slightly lower price of raw material has not yet afforded sufficient margin to warrant reducing prices. Labor cost, it is stated, is a large element in the manufacture of safety tread material, and, furthermore, the large stocks of raw material that are on hand may very possibly be a factor in the price situation.

The railroad business in this market is of course by no means the most important sales outlet, the general outlook for business depending largely upon the building construction industry. Mail inquiries and reports received from field agents, however, are said to indicate a volume of demand later on that will absorb full capacity production.

Railway Motor Production at About Thirty per Cent Capacity

Stock Delivery of Safety Car Type—Car Builders Working Off Last Year's Supply—Present Market Far Below Normal, but Producers Remain Optimistic

Sales of railway motors show considerable falling off this spring compared with last year, producers report. Buying of this class of material has been sub-normal for several years past but the present market seems especially below par. An estimate that demand this year is running about 50 per cent below normal and about 25 per cent below last year has been regarded as conservative to say the least.

Once the war had an opportunity to exert its influence in the raising of prices, sales of railway motors fell off badly. Increased cost of operation and decreased earning power of the railways kept purchases down although the advent of the safety car afforded some relief. This was reflected in sales last year which for one of the large producers increased to about three-fourths of the average yearly total of motors billed during the four-year period previous to the war. More than half of the year's bookings in this instance were made during the first three months of last year, and in comparison with this the first quarter of 1921 saw only one-seventh the same number of motors sold. Furthermore, whereas in the first quarter of 1920 nearly half the motors sold were for safety cars, in the same period this year only about 5 per cent of the total were of this type.

This would seem to indicate a decided slump in the safety car demand, but other information received is to the effect that sales of safety car equipments are still exceeding those of larger types. The reason for the apparent slump in safety car motor sales noted above is probably because virtually all car builders stocked up heavily in 1920 and are still trying to work off stocks of motors which were left on their hands. Motor manufacturers were forced to carry considerable stocks of safety car motors over into this year too, because at this time a year ago factories were running behind and production was increased accordingly. Production is now down to a level commensurate with the market and ranges from 25 per cent of capacity to 30 or 40 per cent.

Stock shipments of safety car motors are being made and reasonable shipments on those of larger capacity. Standard 40, 50 and 65-hp. sizes would probably range about 60 days. Stocks are being reduced and inasmuch as it seems to be the intention not to increase production before the last quarter, it is quite probable that all motor stocks will be considerably depleted within the next few months. Prices have come down from the peak, of course, the reduction in a representative instance amounting to 10 per cent during the past few weeks. Unless there are further decreases in labor and material cost no further price reductions are foreseen, especially while the necessarily curtailed production entails a high overhead.

The outlook for business, producers report, while not good in the immediate future, is such as to induce an optimistic view of the situation. Notwithstanding business depression, it is stated, the market looks promising due to labor reductions and increased revenue over last year on electric railways, and an easier money market. Almost every line in the country badly needs equipment and the view is expressed that railways can not hold off purchasing much longer. Consequently, a slow but gradual increase in business each month is expected.

Rush Orders Feeling Pinch of Deliveries

Policy of Manufacturers in Not Stocking Delays Delivery of Material Needed in Detroit

In connection with the tremendous construction program which is under way in Detroit, Mich., where the city is building an extensive municipal railway system, it has been found difficult to obtain shipments of material promptly enough to meet requirements. On the surface this appears to be a unique situation under prevailing conditions of light buying and prompt railroad deliveries, but it may possibly be a more general condition than is imagined. Reasonably good deliveries can be secured on orders placed normally for future use, it is stated, but where anything is wanted in a hurry it is almost impossible to secure it. As is always the case in any large construction program, there is frequently need for various equipment and material on short notice. Almost without exception, the municipal railway officials report, it has been impossible to find any manufacturer with a stock of the thing wanted on hand.

This is quite evidently an outcome of the declining price situation, for with inventories constantly diminishing, manufacturers are keeping their stocks just as low as possible to avoid loss. The purchaser at this time is then confronted with the necessity to await the manufacture of anything he wants. This is also a reflection of the refusal of railway companies to buy beyond their immediate and pressing requirements, in the expectation that prices will decline. Hence, if railway companies are unwilling to take any chance on a diminishing inventory of stocks on hand in their own storerooms, can they be surprised that the manufacturers should refuse to carry stocks and run this risk in order to meet hurry-up orders of their consumers?

Refractories Lower in Price

Output Greatly Reduced with Demand, but Stocks Are Good at the Mills

Recent price reductions in the refractory market brought Pennsylvania fire-clay brick down $2 per 1,000, while in the middle of April magnesite brick was reduced $10 per net ton in standard sizes, silica brick came down $5 per ton, $5 per net ton was applied to chrome brick and from $2 to $5 to fire-clay brick.

The demand for refractories is at a low ebb. Production, consequently, is in the neighborhood of 25 per cent, some of the larger producers working at a slightly higher rate, while among the smaller producers some shutdowns have been reported. Stocks, however, are in sufficient quantity to last over three or four weeks of normal demand, but at the same time steel mills still have some materials on hand. The steel and glass trades provide the strongest market for refractories, but these two industries are operating at about 40 per cent and 25 per cent rates respectively at present. Fire brick for power boilers provide not only a construction market but also a repair and maintenance market.

Easier Prices Noted on Some Miscellaneous Supplies

With rubber-covered wire selling from jobbers' stocks at prices ranging from $6.75 and $6.50 to around $7.50 per 1,000 ft. in 10,000-ft. lots, depending on the part of the country concerned, it might be expected that other wiring materials could be picked up at considerably lower prices than was the case a couple of months ago. Flexible armored conductor is on a $55 Pittsburgh base price but some jobbers are selling it for this amount in 1,000-ft. lots. Connectors for this conductor were just lowered 12 to 22 per cent.

Some renewable fuse manufacturers just dropped their prices about 17 per cent and at least one maker of fuse wire and fuse links has taken 20 per cent off his prices. From other quarters comes word of a 10 to 17 per cent drop in price of steel switch boxes and in floor boxes.

Westinghouse's Annual Report Shows Favorable Balance

Billings of the Westinghouse Electric & Manufacturing Company for the fiscal year ended March 31, 1921, from the company's annual report just issued, amounted to $150,980,106.39. The net manufacturing profit on the year's business was $12,206,021, even after taking out $5,315,196 for depreciation and adjustment of inventories. An appropriation for a special contingent reserve of $5,000,000 has also been made from surplus to provide for further possible shrinkages and adjustments in the inventories. Total surplus on March 31, 1921, amounted to $56,053,299 after adding a net income for the year of $12,617,535.

Property and plant account shows an increase over the previous year of $9,361,403 and embraces construction completed during the year. An important extension was made to the works at Lester, Pa., where the manufacture of steam turbines, condensers and marine propulsion apparatus is now concentrated, making available additional manufacturing space at East Pittsburgh for electrical apparatus. An additional lamp factory was erected during the year at Indianapolis, Ind., and extensions were made to the plants at Milwaukee, Bloomfield, Bridgeport, Mansfield and East Springfield, Mass. Developments and investments were made in the wireless field and other high-frequency current fields.

Accounts receivable amounted to $34,551,599, while inventories embrace $80,724,389. Total capital stock is $74,812,650.

Electric Railways Place Large Rail Orders

That there is some activity in the field of track construction work this spring, despite general dullness in the business situation, is evidenced by two sizable orders for rails and kindred material recently placed by electric railways. The city of Detroit, Mich., Department of Street Railways has placed an order for rails divided into lots of 900, 200 and 100 tons of different sizes, totaling about $80,000; 10,000 tons of another type of rail at a cost of nearly $600,000; special track-work totaling about $100,000, and double-track specials amounting to nearly $25,000, or a grand total of almost $800,000.

The United Railways of St. Louis has placed an order for 5,000 tons of rails for the reconstruction of 32 miles of track during this year. Spikes, bolts and tie plates are also being ordered. The track construction is to cost about $1,485,000.

Rolling Stock

British Columbia Electric Railway Company, Ltd., Vancouver, B. C., Canada, will change over all its passenger cars with the exception of seventy-one interurbans, to conform to the new rule of the road which is being changed from left to right on or about Dec. 1. The interurban cars are standard but the platforms of the company's 319 city passenger cars will have to be reconstructed. The problem is increased by the fact that out of 231 cars operated in Vancouver, only forty-four are double-end. At least six months will be required to fit up the company's shops for taking care of this work.

Track and Roadway

British Columbia Electric Railway, Vancouver, Can.—Arrangements have been practically completed for changing the rule of the road from left to right in the lower portion of British Columbia on or about Dec. 1 next. Delay was occasioned until the government and the British Columbia Electric Railway could agree to terms on the defraying of the cost of changing the railway system. The government will pay $350,000 toward the cost which is estimated to be $800,000 for the change alone while the company will make other expenditures not essential to the change, bringing the total sum up to about $1,000,000. The change will probably take place in Vancouver and on the rest of the mainland system and later in Victoria, which is on Vancouver

Island. The changing of cross-overs, electric switches and points in the track is involved. On interurban lines changes will be necessary in cross-overs and stations.

Sterling, Dixon & Eastern Electric Railway, Sterling, Ill.—The Sterling, Dixon & Eastern Electric Railway plans to reconstruct its car lines in Sterling, at an estimated cost of $35,000.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has recently placed an order for signal material which will be required for the installation of 68 automatic blocks in double-track sections on the main line in the Charlestown and Roxbury districts. The signals will be the style N, three-indication color-light type and of the same design as installed by the Boston Elevated at Sullivan Square interlocking and on the Everett extension in 1917. Model 15, two-element vane-type track relays will be used throughout. Electro-pneumatic automatic stops will be installed at each automatic signal. A new interlocking is to be installed at Tower D in connection with these improvements. This will be of the A. C. electro-pneumatic type governed by a seven-lever Model 14 power interlocking machine, controlling in addition to the switches, two 2-arm high and three dwarf signals, all of the style N color-light type. Extensive changes are also to be made at the large Tower C interlocking at North Station. These changes involve the installation of 14 two-arm and 10 one-arm style N color-light signals, as well as 15 automatic train stop layouts and 26 A. C. track circuits for the semi-automatic control of signals, detector locks and sectional route locking. All the track circuits will be operated with Model 15 two-element vane type track relays and the same type of instrument will be used for the line circuits. All materials are being furnished by the Union Switch & Signal Company, Swissvale, Pa.

Dallas (Tex.) Railway.—Service has been put into effect on the Lake Avenue extension out Fairmount Avenue to the City Hospital by the Dallas Railway. This is one of the extensions to which the traction company was committed under the terms of the franchise granted the Strickland-Hobson interests in 1917.

Tulsa (Okla.) Street Railway.—The Tulsa Street Railway Co. announces that it will soon begin the work of double-tracking its South Main Street line. Plans are also being prepared for double tracks on other lines and other extensions.

Power Houses, Shops and Buildings

Knoxville Railway & Light Company, Knoxville, Tenn.—The Knoxville Railway & Light Company will install a new substation at Washington and Sixth Avenues.

Professional Note

Parsons, Klapp, Brinckerhoff & Douglas, engineers, announce the removal of their Cleveland, Ohio, office to 743 Hanna Building.

The George H. Gibson Company, New York City, consulting engineers, specializing in commercial research and advertising of technical products, announces the removal of its offices from the Tribune Building to the Hide and Leather Building, 100 Gold Street.

Trade Notes

The Monitor Controller Company, Baltimore, has established a Cleveland office at 420 Permanent Building, in charge of Robert Notvest.

The Lunkenheimer Company, Cincinnati, Ohio, announces the removal of its Chicago branch from 188 North Dearborn Street to 568 West Washington Boulevard.

The Arrow Electric Company, Hartford, Conn., announces that its New York sales office has been removed from 253 Broadway to the Borden Building, 350 Madison Avenue.

C. C. Bradford has been appointed assistant secretary of the Ohio Brass Company, Mansfield, Ohio. Mr. Bradford was at one time sales manager of the United States Light & Heat Company.

The Star Porcelain Company, Muirhead Avenue, Trenton, N. J., manufacturer of electrical porcelain products, contemplates the erection of an addition, 30 ft. x 100 ft., two stories, to its plant.

E. Gindre, president and general manager of Le Carbone of Paris, France, is in the United States for an extended period for the purpose of investigating the prospects in the carbon and carbon-brush business incidental to the possibility of expanding his service in the United States.

Triangle Conduit Company, Inc., Brooklyn, N. Y., on May 5 opened a factory at 1965 West Pershing Road, Chicago, for the manufacture of armored conductors, armored lamp cord and flexible steel conduit. Stocks of these materials will be carried here in addition to stocks of non-metallic flexible conduit, "tri-cord," etc., made in the Brooklyn factory.

Economy Electric Devices Company, Chicago, Ill., has received an order for sixty-eight power-saving railway meters from the American Railways Company, Philadelphia, for use on its Chester Division. These meters will be equipped with car inspection dials to announce intervals between inspections, according to the energy consumption.

The Black & Decker Manufacturing Company, Towson Heights, Baltimore, announces that it is now represented in Pittsburgh by D. C. Paul, formerly with the Gaul, Deer & Shearer Company, Philadelphia. The Pittsburgh office is at 303 Penn Avenue, where there is also a completely equipped service station with a factory-trained service man in charge. This branch, of which Mr. Paul is manager, includes western New York, western Pennsylvania and the northern part of West Virginia.

John J. Swan has become associated with the Engineering Business Exchange, New York City, engaged in the purchase and sale of engineering and technical business properties. Mr. Swan graduated from Cornell in 1897. He was for a time one of the editors of *Engineering News* and has held engineering and executive positions with the Ingersoll-Rand Company, Chicago Pneumatic Tool Company, Longmead Iron Company, Keller Mfg. Company and others.

The Grindle Fuel Equipment Company, 1901 South Rockwell Street, Chicago, is offering, subject to prior sale, the unsold portion of $500,000 in 7 per cent cumulative and participating preferred stock at a par value of $50 a share, together with a bonus of one share of common stock. The proceeds of this sale will be used for additional working capital and for the construction and equipment of a new two-story factory building and a one-story foundry building. The plant will be used for manufacturing and demonstrating coal-handling machinery and equipment and coal-pulverizing equipment, in addition to gray-iron castings for the market.

New Advertising Literature

Fuses.—The Chase-Shawmut Company, Newburyport, Mass., has recently issued bulletin No. 201, describing and giving prices on the full line of material which it manufactures.

Controller. — Bulletin No. 44678A, just issued by the General Electric Company, superseding No. 44678, describes the company's various kinds of drum type controllers for railway service.

Jacks. — The Duff Manufacturing Company is distributing a new bulletin, No. 308, which illustrates and describes its line of automatic lowering jacks especially suitable for use in car repair shops, bridge work and for emergency service.

Engineering Catalog.—The seventh annual edition of "Sweet's Engineering Catalog" has been published by Sweet's Catalogue Service, Inc., New York City, listing in its 1,251 pages "materials, equipment and supplies relating to practical construction, equipment and maintenance of all projects of an industrial or engineering nature."

Tools, Etc.—Ingersoll-Rand Company, 11 Broadway, New York City, has just issued a large new loose-leaf catalog covering its entire line of various track tools, pumps, compressors, condensers, oil and steam engines, etc. A special section is devoted to engineering data covering problems which are frequently encountered in every-day compressed air practice.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, May 28, 1921 *Number* 22

Now the One-Man Interurban Car

ONE-MAN safety cars for use in city service have become so common that they are accepted as a matter of course. Now, in this issue, an article by C. T. Dehore of Cincinnati, Ohio, relates how one-man, double-truck safety cars have recently been installed on a small interurban road running out of that city with satisfactory operating results and a great improvement in the net earnings. A total saving of $29,905 a year in operating costs, creditable to the new type of cars as compared to the old two-man, heavier cars is expected. On a per car basis this amounts to $5,981 per annum. This total saving represents a return of 79.7 per cent on the net investment made to accomplish the improvements, which was $37,500.

There are many small interurban properties over the country on which the use of such light-weight one-man cars should be satisfactory from the standpoint of service. On some of them it would appear that a step of this kind materially to reduce operating expenses would be very much in order if the property is ever to be expected to produce any return to the shareholders. On fairly short lines, where there is no demand for very high speed, such light-weight cars could be adopted with safety, and the power saving that would result is very material, as brought out in the article mentioned. Of course, one-man cars for interurban service would naturally be equipped with double trucks in order to secure good riding qualities on open-type track, which is rarely as smooth as good city track, as well as to permit a free running speed higher than called for in city service and higher than is safe with a single truck.

As to operation with one man, there should be no particular difficulty inasmuch as the traffic requirements would rarely be of the exacting nature of city service. The number of stops per mile is much smaller and the length of standing time while loading and unloading passengers is of less importance as it forms a much smaller proportion of the total schedule than in city service. Furthermore, any abnormal delay in passenger exchange is more readily made up because of the longer running periods. Hence, in view of these differences—lower density of traffic, fewer stops, higher speed, longer distances—it is logical to assume from present knowledge of the standard one-man safety city car that the similar car for interurban service could be made larger than the city car without overburdening the operator. These thoughts are quite evidently embodied in the design of the car described in Mr. Dehore's article.

While it is highly desirable that those interurban lines which connect important terminals and extend into sizable systems should be developed along the lines of heavy traction, it may well be recognized that those other lines which just run out into the country and stop (most of those radiating from Cincinnati being excellent examples of the type) have no such future and that they can best be developed more along the line of street car practices. The paramount issue with most of them is to get the operating cost down to a basis comparable with their limited earning capacity, so that a surplus will be a possibility. The use of one-man, double-truck safety cars seems to offer an opportunity for more economical operation without introducing any particular hazards, though requiring some changes in operating practices. Hence a widening use of one-man, light-weight, double-truck safety interurban cars in the next few years may not be an unexpected development.

Electric Railway Industry Must Expand with Its Opportunities

THE men who have been brought up in the steam railroad field are apt to look condescendingly in a professional way on their electric railway brethren. They feel that the "trolley" men know light transportation only, while they themselves are engaged in real railroading. This attitude must be changed, and that by demonstration of the fact that there is no sharply defined boundary between heavy and light traction. Electric railways are handling short-haul passengers on a scale unheard of in the steam field, and they are doing a freight business also of no mean proportions. A first-class, high-speed interurban railway or rapid-transit system is giving a service in every way commensurate with corresponding steam transportation. When the steam roads are in a position to finance electrification extensively they will find that many of their problems have already been solved for them by the "trolley" fellows. The multiple-unit cars used in large numbers by the electric railways and to an increasing extent by steam railroads are ideal for intense suburban service. Again, the electric locomotive itself is a product of electric railway development.

The application of the electric motor to transportation has developed in three stages. First the horse, the mule, the cable and the steam "dummy" were supplanted. Then the elevated steam lines were electrified and high-speed interurbans were built. Last, and the greatest development of this still lies largely in the future, the steam locomotive is being displaced by the electric locomotive. This development was traced by Frank J. Sprague in his Franklin Institute address, abstracted this week. In other words, the electric motor is gradually pervading the whole field of rail transportation, which is essentially one field. The engineers and manufacturers who are leading in the campaign for railroad electrification aim simply to convince operators who have been "raised" on the steam engine that a better motive power is now available. The performance of the electric motor elsewhere, and to a limited extent in this field, ought to inspire respect for its power producing characteristics.

The Passing of the Woman Conductor

THREE years ago, or during the labor scarcity caused by the war, many women were employed as conductors on cars both in America and Europe, although the practice was followed to a greater extent abroad than here. Since the armistice the number has decreased for one cause or another. On the New York City properties the direct reason was a law passed by the New York Legislature in May, 1919, forbidding the employment of women on trolley cars before 6 a.m. or after 10 p.m. or for more than nine hours a day. In January of the same year the engagement of any more women as conductors in Detroit was forbidden by the National War Labor Board after the dismissal of those employed by the company had been demanded by the union. A few women conductors or guards are still employed on the Hudson & Manhattan Railroad and on some other lines, but in general throughout the country they have disappeared from service as members of train crews.

The subject may almost be said to have been forgotten by railway men, but has been brought up through a report recently issued by the Women's Bureau of the United States Department of Labor and reviewed in these columns. The conclusions of this report are generally favorable to the service as suitable to women and less onerous and more highly paid than many other lines in which women are employed. Before the subject is passed entirely, it might be worth while to put on record some of the conclusions reached from the railway standpoint during a somewhat limited trial in this country of women conductors.

In the first place there is some additional expense involved to a company employing both women and men in the transportation service over that required when only men are employed, owing to the necessity of providing separate quarters at the carhouses and elsewhere. This means that even if everything else was equal, to make the engagement of women no more expensive to the company the women would have to receive a lower wage than the men. Just how much this differential would be it is hard to say, but it is obvious there would have to be some differential.

In the second place, the tendency toward the use of one-man cars, in the opinion of most operators, still further cuts down the opportunity for women as part of the transportation force. It is probable also that their less physical strength handicaps women for the position of conductor on some lines. Again, new legislation limiting the conditions under which work may be done or the hours in which it may be performed is apt to be more stringent in the case of women employees than with men employees, and any material difference in the conditions or hours permitted for the two classes would require a division into a favored and a less favored class, and this would interfere with seniority rules.

Finally, there is now no difficulty and there probably will not be for a considerable time, at any rate, in securing a sufficient number of men for platform service, so that there does not seem to be the same reason for the engagement of women as during the war.

Abroad, both in England and on the Continent, women have been employed as substitutes for motormen as well as conductors. Testimony as to their fitness for this work varies, but on some roads they are considered superior to men, or certainly to the men who could be hired at the same wages. The way in which this superiority is shown is in the exercise of greater care and the acceptance of greater responsibility in their work. As the use of women as substitutes for motormen has been very limited in this country, American evidence on this point is not of much value.

The modern car has so many labor-saving appliances that much manual power is not required by either a conductor or motorman. Hence the tendency will be more to judge applicants on the basis of intelligence, faithfulness and similar qualities rather than on strength. Nevertheless, the greatest use for women, for some time to come, at any rate, in electric railway transportation service will probably be in the stations and offices and not on the cars.

Has Connecticut Shown the Way in Valuation Procedure?

THE recent valuation of the property of the Connecticut Company, made, as it was, by the Public Utilities Commission of the State, is of more than usual interest. It is what the commission calls a business-like valuation and marks a departure from the usual method of obtaining the fundamental information upon which a commission bases its final action. In this issue Mr. Knowlton finishes his analysis, started last week, of this valuation, and outlines the method by which it was possible to save so much time and money in obtaining the necessary data. A critical examination of this is recommended to all who are interested in valuation procedure. It should be kept in mind, however, that the purpose of this two-part article is to outline and analyze a method. Complete figures naturally cannot be given for application elsewhere and details of the method itself would probably have to be modified in case of its application to other properties.

Progress in valuation practice has, of course, been evident in recent years. This, however, has been chiefly in that the engineers of the various contending groups have agreed upon an appraisal figure for the physical property and thus avoided endless litigation. Instances are the Pittsburgh, Scranton and Nashville valuations. Another step was taken in New Jersey, where the engineers were asked to take the place of the commission, so to speak, and, considering all factors, to name the total valuation figure. But each of these has been accompanied by a long and expensive inventory, which is most undesirable both from the standpoint of expense and also delay and suspense. In these statements regarding the recent New Jersey valuation the inventories made during the previous valuations and used by the last engineers are considered a part of the total appraisal work.

The question is how to get away from this and Connecticut seems to have given one answer. Here more than $50,000,000 worth of property (on a 1910-1915 price basis) was appraised in less than six months and historical value was also determined at a total cost to the commission of less than $10,000. Several factors made this possible: the work was done largely by salaried engineers and accountants of the commission, who already had an intimate knowledge of the property; the commission specified that it wanted a "business-like" valuation; the records of the company were unusually specific and detailed as to the various facts needed. But these factors do not weaken the method, rather do they strengthen it. The method of appraisal itself is logical—the use of measuring sticks for outside plant and the application of usual business judgment all through. It is of interest to note the relation of the total thus found to the historical cost, and that the appraised value of the physical property differed not more than 2 per cent from the book value of the company.

Most important, the commission accepts and uses this value in its report to the Legislature; the Legislature, in turn, bases its present program of railway legislation upon this report, thus tacitly accepting it as valid. The commission and legislative sanction of this method of appraisal is significant. More than ordinary weight may be given to the attitude of the Legislature in view of the fact that the chairman of the committee considering the report is himself an engineer of note in the State.

Objection to the method itself may be urged in that, by the adoption of unit yardsticks, instances of abnormal construction, of special installations, etc., may be neglected or minimized. But the inspection of the entire system and the method of obtaining a typical unit are both checks against this. And then, actually, way down in his heart, what valuation engineer is there who doesn't use the mile of track, the 1,000 ft. of overhead, the kilowatt of power station and substation as the real check or measure of the reasonableness and accuracy of his valuation, made by however detailed a method? There seems much to support the direct use of such figures if they can be determined with sufficient accuracy to carry weight in the individual case, and this is what Mr. Knowlton tries to show has been done in Connecticut. There are so many other factors than mere physical appraisal which really affect the final rate that it is a serious question whether the expenditure of so much time and money in determining this figure is really justified.

To be sure—to answer a self-evident question—no rates have yet been determined upon this as a base. But Mr. Knowlton shows within what wide limits an appraisal may vary without any effect upon a rate, and as a matter of fact, in how many cases has the valuation had an appreciable—still less a controlling—effect upon rates, anyway?

A valuation figure adopted means business life or death, economic success or failure, more often than anything else. It is fundamentally a business question rather than a rate question and is so recognized by the Connecticut Commmission.

But what will valuation engineers do? Frankly, they may lose one source of lucrative practice. But they ought to be more anxious and willing than any one to adopt a business-like basis of appraisal and to save the time and drudgery of detailed inventory. Valuation is not constructive, though it may be necessary. Engineering is fundamentally constructive and engineers should welcome anything which will relieve them of non-constructive work so that their energies may be directed toward constructive lines.

A big question is the court attitude. Legal rules of evidence have been largely responsible for present appraisal procedure. But there is encouragement in court attitude today. Note the "reasonableness" introduced by the Supreme Court, for example. And courts are more and more inclined to be business-like themselves and to allow commissions to establish their own procedure. In this case, the sanction of both commission and Legislature should have much weight in determining the attitude of the court and therefore the result af any possible court action should a case based on this valuation come up for review.

Viewed broadly, valuation procedure is tending in the right direction. The American Electric Railway Association valuation committee is studying the problem of how to reduce the time and expense of appraisals. It seems logical to approach a business question from a business angle. Connecticut has made a worth-while contribution in this connection to valuation procedure.

Tax Exemption Extended in Massachusetts

IT IS APPARENT that the members of the Massachusetts Legislature are satisfied that their street railways are not yet out of the financial difficulties which began before the war, but were brought to a head by the extreme conditions which that conflict caused. As reported elsewhere in this issue, the Governor's signature has recently made a law of the bill to exempt the companies for the next two years from the operation of the excise tax, imposed in commutation of the cost of repairing and maintaining highways and bridges.

The reputation of the old Bay State as a leader in wise and conservative legislation and regulation concerning her street railways is too well known to require further extensive comment at this time. Having from the beginning restricted the capitalization of the companies to actual cash investment and having prohibited the issue of stock at anything less than par, this State now shows a disposition to make reasonable provisions looking toward the protection of such investments. It is true that a number of companies in that state have been through a receivership, and many miles of track have been abandoned. Perhaps not in all, but at least in a goodly proportion, such cases have been where over-optimistic promoters have built in sparsely settled territories, or where lack of foresight on the part of the managements has resulted in financial embarrassment. No Legislature can be expected to go out of its way to offer protection in such cases. But the recognition by the Massachusetts Legislature of the general financial hardships which the industry as a whole is suffering through no fault of its own is an encouraging sign.

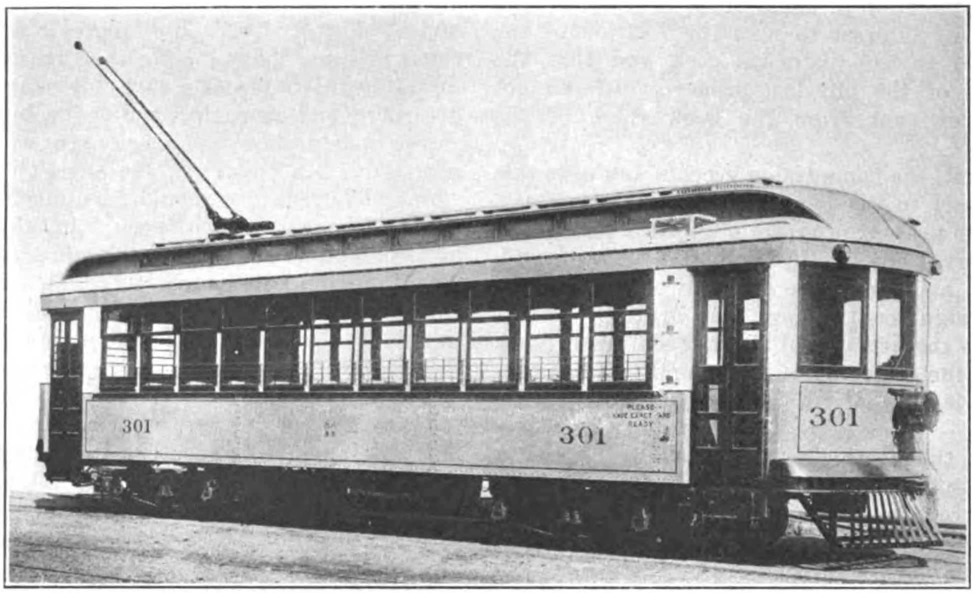
The action of the Speaker of the House of Representatives of Massachusetts in standing up for and securing a reconsideration of the exemption bill, after the original motion was defeated, was an exceptionally courageous proceeding, in view of the apathy if not direct antagonism of the general public toward the financial prosperity of utilities.

Quotation from the Federal Electric Railways Commission Report

No. 22

THE electric railways should adopt the policy of setting aside a depreciation fund with which to take care of replacements and thus preserve the integrity of their investment. It would have a very wholesome effect upon credit. Such has not been the practice in the past. Deferred maintenance has accumulated to an alarming extent during the war period.

Generally speaking, regulating commissions have the power to prescribe methods of accounting and to establish the amount of the depreciation fund. This practice should be observed, and its adoption will improve the situation of the industry and be greatly in the interest of the public welfare.



SINGLE-END, DOUBLE-TRUCK, ONE-MAN SAFETY CAR FOR INTERURBAN SERVICE

One-Man Cars for Interurban Service

How the Cincinnati, Milford & Blanchester Traction Company Met a Difficult Financial Situation by Installing New Equipment and Making Such Changes as Would Greatly Reduce Operating Costs

BY C. T. DEHORE
Cincinnati, Ohio

FACED with an inevitable receivership unless operating costs or earnings could be radically changed, the Cincinnati, Milford & Blanchester Traction Company, Cincinnati, Ohio, under the direction of J. P. Perrung, president and general manager, decided in January, 1920, to take immediate and drastic action to stem the tide of rising costs. The criticalness of the situation can be readily understood from the few words explaining that during one month in the fall of 1920 the cost of power alone was 60 per cent of the total receipts. It is said that had the changes which were effected been delayed three months longer the railroad probably could not have held out. As a result of the changes made, however, it will be possible to continue operation on the line, and in fact indications are that the financial crisis has been passed and that the company should now be able to wipe out its debts and become a paying property.

The changes which were decided upon and which were put into effect as quickly as the new equipment could be secured were these: The old 30-ton, forty-four-passenger, two-man cars were replaced with 15-ton, forty-seven passenger, one-man, double-truck cars. A 1,000-kw., 25-cycle generating station was shut down and arrangements were made for purchasing power from the Union Gas & Electric Company of Cincinnati at 13,200 volts 60-cycle frequency. For the 1,100-kw. capacity of 25-cycle substation equipment 400-kw. capacity of 60-cycle equipment was substituted. The fourth major change made was in connection with the light and power business handled by the company, wherein a 100-kw. frequency changer was displaced with 250-kw. capacity in lighting transformers, which enabled the company to take on 250 new commercial customers.

The C., M. & B. T. line is 28.8 miles long and connects Cincinnati (Madisonville) with Blanchester, Ohio. In addition to handling passengers, freight, milk and express, the company does a general lighting and power business in towns along the line. Travel on the Blanchester end of the road is very light, while fairly good traffic is obtained on the Madisonville end, particularly in the warmer months, when summer homes and camps along the Miami River are open. The equipment formerly in use and the operating conditions generally were similar to those found on a great many other small interurban lines, namely, heavy, obsolete rolling stock with power supplied from a small-capacity and inefficient generating plant.

The old rolling stock consisted of eight passenger cars, three freight cars and two work cars. The passenger cars were in need of paint and repairs and had practically outlived their usefulness. They weighed about 30 tons each, were geared for high speed and were equipped with two different types of old-style motors. These cars were replaced, under the rehabilitation plan, with five 15-ton, forty-seven-passenger, single-end cars equipped with standard safety devices for one-man operation, probably the first cars of this type for interurban operation. They were built by the Cincinnati Car Company. They have a standard monitor deck roof, are 40 ft. long and 8 ft. 6 in. wide and have steel underframes and side-girder plates, wood posts and letterboards and composite superstructure.

There are eleven windows on each side, and notwithstanding the inclusion of a stove and toilet, seats for forty-seven passengers are secured by using the rear "platform" as a smoking compartment. This popular compartment will seat five passengers and it is separated from the main passenger section by a partition and a swinging door. The seats are the Hale & Kilburn 38-in. stationary type with rattan-covered spring cushions and backs. The heater is of the Jewel hot-air type with motor-driven blower. Lighting is obtained from ten 56-watt lamps arranged in a straight line through the center of the ceiling and used in combination with G.E. shade holders and receptacles fitted with holophane shades.

The trucks are of the arch-bar type with a combination semi-elliptical and spiral spring design and a wheelbase of 5 ft. 8 in., manufactured by the Cincinnati Car Company. The electrical equipment consists of four G.E. 264-A, 25-hp. sleeve-bearing motors, and one K-35 controller. A G.E. J-37 type headlight with the new design of "GECO" resistor is used. The air-brake equipment includes the type CP-27 compressor and type ML Form A governor. The cars are geared for a free running speed of about 32 m.p.h. and make a schedule speed of 20 m.p.h. Hourly service is given during the winter months and half hourly service during the summer.

Heretofore, power was manufactured in a steam plant located at Milford, 8.5 miles from the Madisonville end of the line. The equipment there consisted of four 200-hp. Stirling boilers and two engine-driven 500-kw., 370-volt, 25-cycle generators. The engines needed overhauling; the boilers were in only fair shape and an addition to the smokestack was necessary to replace a section blown down in a windstorm. The immediate repairs needed called for an expenditure of about $3,500. The energy used for light and power customers was secured from a 100-kw. frequency changer located in the power house and consisting of a 370-volt, 25-cycle motor and a 2,300-volt, 60-cycle generator. This unit was badly overloaded and there was no reserve capacity available. In fact, the company had reached the point where it was forced to turn away new business.

To alleviate this situation and place the power cost on an economical basis a contract was negotiated with the Union Gas & Electric Company of Cincinnati whereby this company built a 13,200-volt, 60-cycle transmission line to the railway company's substation at Indian Hill, where power is delivered and metered to the latter. The power contract is based on a fixed maximum demand charge with a sliding scale rate for actual energy consumed, so that the railway company has a chance to lower its rate by leveling off its load factor. As an instance of how this may be done, the railway company found that by changing its freight-car schedule slightly it was able to reduce the maximum demand charge about $100 per month. An effort is now being made to secure some pumping load to be handled at night, which will further reduce the cost per kilowatt-hour.

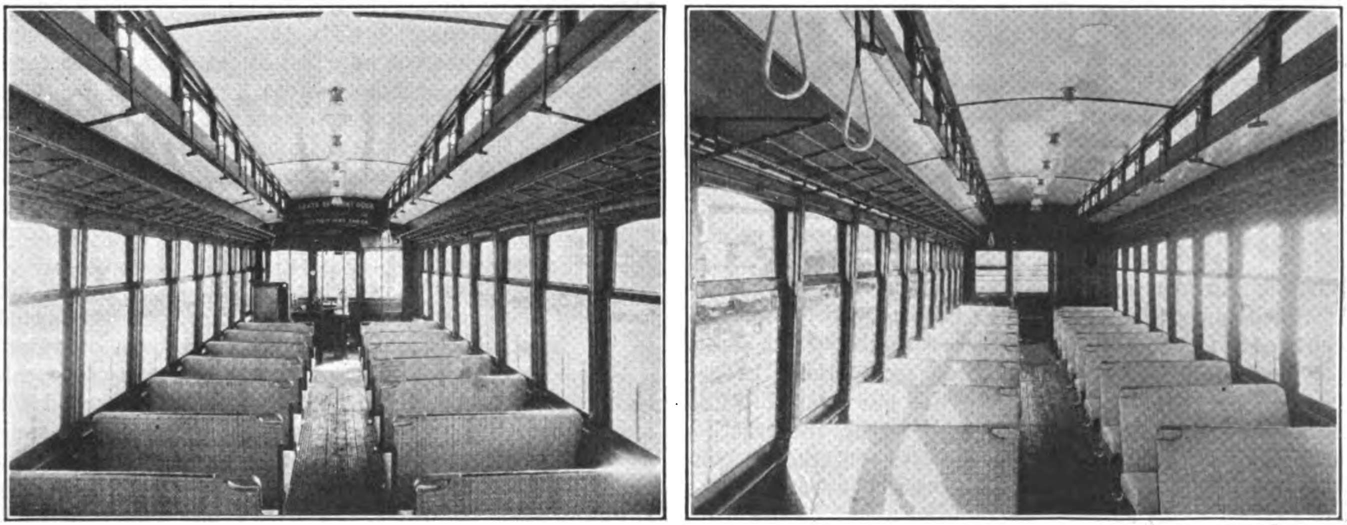
As the power company has a 120,000-kw. turbine generating station of modern design and is in a position to furnish unlimited power, the railway company has laid out its distribution system so that it can be quickly and economically extended to serve new customers. An increase in the gross receipts from the light and power department of from $2,000 to $3,500 per month has been secured as the result of new customers connected.

Under the old system of operation the company had a 300-kw. substation at Indian Hill, 5 miles from Madisonville; a 400-kw. substation in the power house at Milford, 3.5 miles farther, and a 400-kw. substation at Newtonville, 9 miles from Blanchester. The total substation capacity was then 1,100 kw. Under the new plan only two substations are used, one at Indian Hill and the other at Newtonville. Each is equipped with one 200-kw., 600-volt, six-phase, 60-cycle G.E. commutating pole rotary converter. The total substation capacity on the system is thus seen to be 400-kw., sufficient for handling the new light-weight cars.

To make the changes necessary, as described briefly above, the company required an initial investment of $63,000, against which there is a credit for salvage of about $25,500, leaving a net capital investment of $37,500 as outlined below:

INVESTMENT COSTS

Five new cars complete at $9,000		$45,000
Two 200-kw. substations at $6,500		13,000
Three lighting transformer stations		5,000
Total cost		$63,000
Less salvage:		
Six 4-motor cars	$6,000	
One 1,000-kw. power station	15,000	
Three rotary converters, etc	4,500	25,500
Net investment		$37,500



TWO INTERIOR VIEWS, ONE SHOWING FARE BOX, AT THE FRONT END AND THE OTHER THE SMOKING COMPARTMENT AT THE REAR END

COMPARISON OF OPERATING COSTS

	Old System	New System	Saving
Platform wages (passenger), actual	$14,325	$8,290	$6,035
Power (1919 costs)	42,500	21,120	20,620
Maintenance of cars (estimated)	8,500	6,300	2,200
Tie renewals (estimated)	8,750	7,700	1,050
	$74,075	$43,410	$29,905
Increase in lighting business per year (actual)			18,000
Increase in net earnings			$47,905

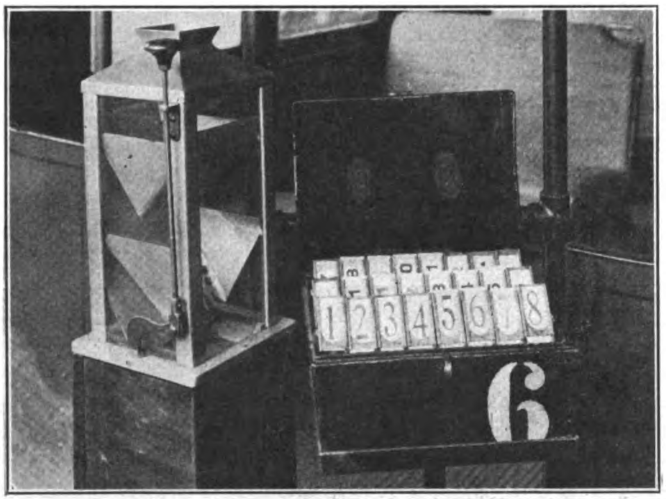
STATISTICS

	Old System	New System
Passenger car-miles	280,000	280,000
Freight car-miles	20,000	20,000
Total kilowatt-hours	2,131,000 kw.-hr.	1,408,000 kw.-hr.
For passenger cars	1,680,000 kw.-hr.	700,000 kw.-hr.
For freight cars	108,000 kw.-hr.	108,000 kw.-hr.
For light and power	343,000 kw.-hr.	600,000 kw.-hr.
Kw.-hr. per car-mile (passenger)	6.0	2.5
Kw.-hr. per car-mile (freight)	5.4	5.4
Maintenance per car-mile	2.83 cents	2.1 cents
Track and roadway maintenance per car-mile	5.3 cents	4.95 cents
Tie spacing	2 ft., 0 in.	3 ft., 0 in.
Platform wages per hour, per man	50 cents	58 cents

As a result of this expenditure the company has increased the net return about $47,905 per year, and this figure does not make allowances for 1920 coal prices. (It actually cost the company $66,000 in 1920 to produce power.) The figure for power in the column "Old System" in the table above is based on 1919 costs.

The saving in platform wages given above is the actual saving obtained after allowing the operators of the safety cars an increase of 8 cents per hour. The saving in power is the actual difference between what it cost in 1919 to produce power in the company's old plant and the cost to purchase their requirements in 1921.

The saving in maintenance is estimated on the basis of a somewhat higher figure than is actually being obtained for similar cars on the Cincinnati, Lawrenceburg & Aurora Traction Company after three years of operation, the actual cost on that railway being 1.45 cents as compared with the above estimate of 2.1 cents.

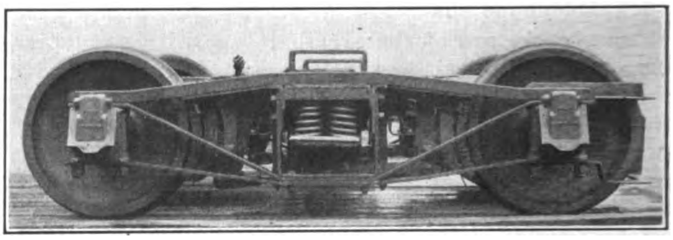


CLOSE UP OF FARE BOX AND ZONE TICKET BOX

The saving in tie renewals is based on only 12 per cent of the actual cost of 7,000 ties per year at $1.25 each. With the light-weight car, however, the traction company is now spacing ties at 3-ft. centers, as compared to 2-ft. formerly. This means that eventually the tie renewals will actually be reduced about 40 per cent, although this latter figure will not be reached for some three or four years to come. This saving is not theoretical. It has actually been determined from results obtained by the Union Traction Company, Nashville, Tenn., which has operated similar weight cars for about fifteen months, and the Cincinnati, Lawrenceburg & Aurora Traction Company, Cincinnati, which has operated them for three years.

FARE COLLECTION METHOD

The collection of fares at first seemed rather complicated, but has really worked out very satisfactorily. There are twenty-two zones, some of which overlap, and it seemed quite a task to work out a plan where one man could handle the situation promptly and efficiently. The system adopted is as follows:



ARCH-BAR TRUCKS USED ON LIGHT-WEIGHT, ONE-MAN INTERURBAN CARS

A standard Cleveland fare box is used and all fares are collected pay-as-you-enter. The passenger deposits his fare, either cash, regular ticket or commutation ticket, in the fare box and is presented with an identification ticket (hat check), bearing the number of the zone to which he is entitled to ride. Upon reaching his destination he deposits this identification ticket in the box. Should the zone in which the passenger is alighting not correspond with the number on the ticket the operator calls his attention to this and requests any additional fare that may be due.

The zones are numbered from 1 to 22 from the Madisonville end toward Blanchester, and these numbers are the same, regardless of the direction the car is going.

The identification ticket is 2 in. long x ¾ in. wide, with a large zone number printed on both sides so it can easily be read, regardless of how it falls in the fare box. Smaller figures are also printed along the edge of the identification ticket, and, in the case of a cash fare, the number corresponding to the zone in which the passenger boards the car is punched out. These numbers are not punched in case of a ticket fare. For example, a passenger boards a car at Madisonville (Zone 1) and deposits cash fare to ride to Milford (Zone 7). The operator punches out 1 in the small figures of a No. 7 zone ticket. If the passenger deposits a regular or commutation ticket, however, no punch mark is necessary, and he is simply given a Zone 7 ticket unpunched.

It is interesting to note that so far as is known not a single instance of over-riding has been attempted in the four months that the cars have been operated.

When service with the new cars and new fare collection system was started off, two men were used for about forty-five days to allow the operators, as well as the public, to become thoroughly acquainted with the operation. Since that time the cars have been running just as successfully with one man; in fact, most of the operators state that they prefer the one-man operation and responsibility.

Railway Valuation in Connecticut—II*

Development and Application of "Unit-of-Construction" Method of Appraisal in Valuing Large Railway System

BY ARCHER E. KNOWLTON
Instructor in Electrical Engineering, Yale University

IN LAST week's issue Mr. Knowlton presented the arguments which led the Public Utilities Commission of Connecticut, and its engineers, to adopt what they called a "practical, business-like valuation" of the electric railways of the state and also some details of how the "non-outside-plant" accounts were treated.

In this issue, the details of the "unit-of-construction" or "yardstick" method of appraisal are described and the method justified. It was by the use of this method, more than any other one item, that made possible this valuation of more than fifty million dollars' worth of property at a cost of approximately $10,000 to the state and not to exceed that sum to the company. The time consumed in this whole valuation was less than six months and even during this period the engineers had many regular duties to attend to besides the valuation

—EDITORS.

IN THE previous article several arguments were advanced in favor of a quick and inexpensive appraisal of utility property and it was suggested that the greater saving in time and money could probably be effected in dealing with the "outside plant." In both surface construction and overhead electric construction there is presented a peculiar combination of practical uniformity for stretches of more or less length and, at the same time, wide diversity between the characteristics of even consecutive stretches. The engineers (E. I. Rudd, J. P. Wadhams and the writer) who appraised the street railways of Connecticut for the Public Utilities Commission of that state decided to ascertain the value of the extended property as far as possible by setting up an appropriate number of types of construction for track and paving, contact system, feeders, telephones and signals, transmission lines and bonding and then applying these types in "yardstick" fashion to those properties. It was recognized, of course, that occasional irregularities would not conform to these types, but it was not anticipated that the total value of the irregularities would be great enough to invalidate the results obtained by applying the type costs.

LOW-VOLTAGE DISTRIBUTION SYSTEM

In investigating the possibility of applying the unit-of-construction method of appraisal to the contact-system, it was quickly ascertained that the character of the highway or community, the type of service provided, and the presence of other utilities' wire circuits were the ruling factors in determining the type of contact construction employed by the street railway company. With the exception of the third item, these factors are usually found to continue constant for sufficient distance to result in practical uniformity of the railway construction for distances of several hundred feet. It was estimated that an observer on an inspection car could probably note the character of construction and status of pole ownership in the various sections and, in addition, identify the points of change in about one-sixth of the time required for two or three men to walk the same section and tally in detail every item of physical property. This estimate was not irreconcilable with the actual experience; the 480 miles of route were covered in about sixteen days and the speed of travel gave ample time to note all necessary features of feeder system, telephones and signals as well as of the contact system. It will be noticed that no reference is made to measurements of lengths in the field. Three principal office sources for such information were available and practically no field measurements were necessary. The company's mileage maps gave, to the nearest thousandth of a mile, the distances from the traffic center to switching points of turnouts, special trackwork and sidings, to town lines, railroad crossings and the line termini. Track and paving sheets prepared and maintained by the company's engineer of maintenance of way gave much detail on rail, paving and ballast and often the points of transition coincided with those for the overhead construction for which no lists were available. Finally highway maps of the state were of aid in other instances.

Before proceeding to establishment of the fundamental types of contact construction, it is necessary to touch upon the extensive practice of wire companies in Connecticut as to joint use and joint ownership of wood poles. One of the joint occupants is agreed upon as the builder and custodian of the line; it shall keep an accurate record of the cost of the construction and subsequently bill the other joint owners for their proper share of that cost, which includes field labor, materials, vehicles and a percentage increment for engineering and supervision. Analysis of the costs of representative sections of line jointly occupied by the street railway, in some cases built by the railway forces but more often by those of other utilities, led to the adoption of the following ratios in value to the railway company between solely owned and occupied wood poles and those jointly owned and occupied:

	Per Cent
Solely owned pole	100
One-half interest in two-party pole	62½
One-third interest in three-party pole	50
One-fourth interest in four-party pole	33⅓

The existing cases of permit and rental attachments were treated as joint ownership cases on the assumption that they would practically balance by reciprocity.

As for the size of trolley wire to use in setting up the types, examination of one representative division showing the usual proportions of business district, residential, suburban and rural mileage resulted in an average size of 0.453 lb. per foot. This figure was used even though it is not a commercial size, and the costs of wire, ears, etc., were obtained by interpolation.

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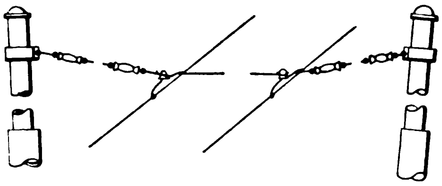
*In two parts. Many data and supporting figures for the electrical part of the appraisal treated in this installment are given in greater detail than possible here in a thesis Mr. Knowlton has just presented to the faculty of the Graduate School, Yale University. Complete data are of course on file at the office of the commission in Hartford.

FIG. 1—COST OF SPAN CONSTRUCTION, IRON POLES, DOUBLE TRACK



Type	Cost of SSID Poles	Plus Per Cent of SSID Poles	Plus Part Cost of SSID Poles	Cost 1,000 Ft. SSID Less Poles	Cost of Joint Construction	
					Per 1,000 Ft.	Per Mile
SSID	$685.00	100.0	$685.00	$257.32	$942.32	$4,975.54
SJ_2ID	....	62.5	428.13	......	685.45	3,619.17
SJ_3ID	....	50.0	342.50	......	599.82	3,167.05
SJ_4ID	....	33.33	228.33	......	485.65	2,564.23
SSJ_2ID	....	81.25	556.56	......	813.88	4,297.29
SSJ_3ID	....	75.0	513.75	......	771.07	4,071.25
SSJ_4ID	....	66.67	456.67	......	713.99	3,769.87

Per Span							Per 1,000 Ft. Section					
No.	Each	All	F.C.W.*	A.I.†	Total	Item	Size	Quan.	F.O.B.	F.C.W.	A.I.	Total
2	$24.10	$48.20	$3.10	$17.20	$68.50	Iron poles (caps, gds, conc., S-W.) 934 lb.	No. 3-30 ft.	20	$482.00	$31.00	$172.00	$685.00
2	.19	.38				Pole bands	5 in.	20	3.80			
50 ft.	.009	.45				Span wire	$\frac{5}{16}$ in.	500 ft.	4.50			
4	.16	.64				Wood strain insulators (no clevis)	9 in. E	40	6.40			
2	.368	.74				Straight line hangers		20	7.40			
		2.21	.11	1.00	3.32	Span assembled and installed			22.10	1.10	10.00	33.20
	.39					Strain plate		2	.78			
	.21					Wood strain insulators (with clevis)		16	3.36			
	.009					Anchor wire		600 ft.	5.40			
						Strain complete			9.54	.48	2.25	12.27
						Trolley wire						
						Ears						
						Suspended trolley wire		2,000 ft.				175.85
						Truck or line car, 4 days on poles 0.8 days on wire		4.8			7.50	36.00
						Finished construction		1,000 ft.				$942.32

In adopting the types and the associated symbolic notation, the four aspects of contact construction which determine its character and cost are, with the codes for use in the field inspection:

A. **Suspension**
Bracket = B
Span = S

B. **Ownership of Poles**
Sole = S
Joint = J

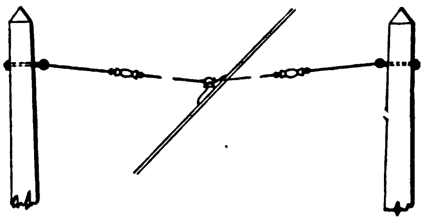
C. **Pole Material**
Wood = W
Iron = I
Concrete = C

D. **Number of Tracks**
Single = S
Double = D

The fundamental combinations of these elements were taken to be the following:

1. Bracket construction, Sole ownership, Wood poles, Single track = BSWS
2. Bracket construction, Sole ownership, Wood poles, Double track = BSWD
3. Bracket construction, Sole ownership, Iron poles, Single track = BSIS
4. Bracket construction, Sole ownership, Center Iron poles, Double track = BSID

FIG. 2—COST OF SPAN CONSTRUCTION, WOOD POLES, SINGLE TRACK

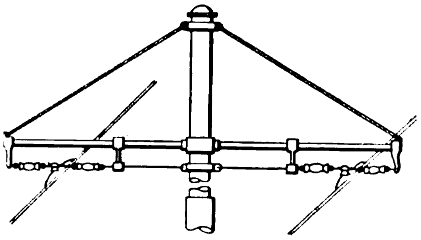


Type	Cost of SSWS Poles	Plus Per Cent of SSWS Poles	Plus Part Cost of SSWS Poles	Cost of 1,000 ft. SSWS Less Poles	Cost of Joint Construction	
					Per 1000 Ft.	Per Mile
SSWS	$158.80	100.00	$158.80	$156.51	$315.31	$1,664.84
SJ_2WS		62.50	99.25		255.76	1,350.41
SJ_3WS		50.00	79.40		235.91	1,245.60
SJ_4WS		33.33	52.93		209.44	1,105.84
SSJ_2WS		81.25	129.03		285.54	1,507.65
SSJ_3WS		75.00	119.10		275.61	1,455.22
SSJ_4WS		66.67	105.87		262.38	1,385.37
SJ_2J_3WS		56.25	89.33		245.84	
SJ_2J_4WS		47.90	76.07		232.58	
SJ_3J_4WS		41.66	66.06		222.57	

Per Span							Per 1,000 ft. Section					
No.	Each	F. O. B.	F.C.W.	A.I.		Item	Size	Quan.	F. O. B.	F. C. W.	A.I.	Total
2	$3.25	$6.50	$2.68	$6.70	$15.88	Chest. poles, shaved, treated, set	.. 30 ft.	20	$65.00	$26.80	$67.00	$158.80
2	.095	.19	.02	.40		Eyebolts, nuts, washers	¾ in. x 16	20	1.90	.24	4.00	
50 ft.	.009	.45				Span wire	$\frac{5}{16}$ in.	500 ft.	4.50			
2	.16	.32	.05	.60		Wood strain insulators (no clevis)	9 in. E	20	3.20	.50	6.00	
1	.368	.368				Straight line hangers		10	3.68			
		1.328	.07	1.00	2.402	Span assembled and installed			13.28	.74	10.00	24.02
	.39	.39	.02			Strain plate		1	.39			
	.21					Wood strain insulators (with clevis)	9 in.	16	3.36			
	.009					Anchor wire	$\frac{5}{16}$ in.	600 ft.	5.40			
						Strain complete			9.15	.45	2.00	11.60
lb.	.162		.01		.172	Trolley wire 1,000 ft.	.453 lb./ft.	453 lb.	73.39	4.53		
1	.26		.01		.27	Ears		11	2.86	.11		
ft.				.007		Suspended trolley wire		1,000 ft.	76.25	4.64	7.00	87.89
						Truck or line car, 4 days on poles 0.4 days on wire					7.50	33.00
						Finished construction		1,000 ft.				$315.31

*F.C.W. indicates Freight, Cartage and Warehousing. †Indicates Assembly and Installation.

FIG. 3—COST OF BRACKET CONSTRUCTION, CENTER IRON POLES, DOUBLE TRACK



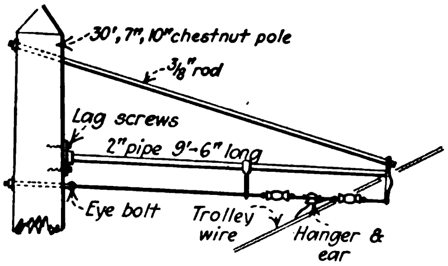
Type	Cost of BSID Poles	Plus per Cent. of BSID Poles	Plus Part Cost of BSID Poles	Cost of 1000 ft. BSID Less Poles	Cost of Joint Construction	
					Per 1000 ft.	Per mile
BSID BJ$_2$ID BJ$_3$ID BJ$_4$ID	$342.50	$100.0 62.5 50.0 33.33	$342.50	$295.27	$637.77	$3,367.43

Per Poles							Per 1,000 ft. Section					
No.	Each	F.O.B.	FCW	A. I.	Total	Item	Size	Quan.	F.O.B.	FCW	A I.	Total
1	$24.10	$24.10	$1.55	$8.60	$34.25	Iron poles (caps, gds., conc. & S. W.)	No. 3-30 ft.	10	$241.00	$15.50	$86.00	$342.50
2	.19	.38				Pole Bands	5 in.	20	3.80			
2	1.26	2.52				Bracket arm, middle and end casting	2 in.x9.5 ft.	20	25.20			
1	.20	.20				Pole casting	5 in.	10	2.00			
2	.35	.70				Over suppt. rod, thrd. nuts, washers	⅜ in. x 11 ft.	20	7.00			
4	.16	.64				Wood strain insulators	9 in. E	40	6.40			
30 ft.	.009	.27				Span wire	$\frac{5}{16}$ in.	300 ft.	2.70			
2	.368	.73				Straight line hanger		18	6.57			
		5.44	.27	2.00	7.71	Brackets complete, less two hangers			53.67	2.70	20.00	76.37
						Strain complete		2				15.90
						Suspended trolley wire	2,000 ft.					174.50
						Truck or line car 3 days on poles 0.8 days on wire					7.50	28.50
						Finished construction		1,000 ft.				$637.77

5. Span construction, Sole ownership,
Wood poles, Single track = SSWS
6. Span construction, Sole ownership,
Wood poles, Double track = SSWD
7. Span construction, Sole ownership,
Iron poles, Single track = SSIS
8. Span construction, Sole ownership,
Iron poles, Double track = SSID

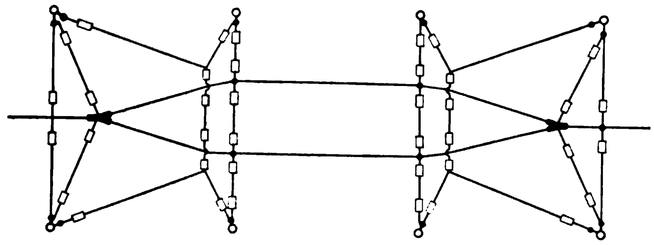
Differences in cost between the rigid and flexible bracket and between double brackets on center poles and long brackets on side-location poles for double track were insignificant and therefore ignored. The cost of a thousand-foot section of each one of these types was then tabulated, the arrangement conforming to the actual subdivision of the work during assembly and construction. Figures 1 to 4 show the tabulated costs for some of the types. The table in the upper right hand

FIG. 4—COST OF BRACKET CONSTRUCTION, WOOD POLES, SINGLE TRACK



Type	Cost of BSWS Poles	Plus Per Cent of BSWS Poles	Plus Per Cent Cost of BSWS Poles	Cost of 1000 ft. BSWS Less Poles	Cost of Joint Construction	
					Per 1000 ft.	Per Mile
BSWS BJ$_2$WS BJ$_3$WS BJ$_4$WS	$79.40	100 62½ 50 33⅓	$79.40 49.60 39.70 26.47	$151.69	$231.09 201.29 191.39 178.16	$1220.15 1062.81 1010.54 940.68

Per Bracket							Per 1,000 Ft. Section					
No.	Each	All	F.C.W.	A. I.	Total	Item	Size	Quan.	F.O.B.	F.C.W.	A. I.	Total
1	$3.25	$3.25	$1.34	$3.35	$7.94	Chest. poles (shaved, treated, set)	30 ft.	10	$32.50	$13.40	$33.50	$79.40
1	1.395	1.395				Bracket arms plus castings	2in.x9.5ft.	10	13.95			
1	.089	.089				Eyebolts and washers	⅜x12 in.	10	.89			
2	.015	.03				Lag screws	½x4 in.	20	.30			
2	.16	.32				Wood strain insulators (no clevis)	9 in. E	18	2.88			
15	.009	.135				Span wire	$\frac{5}{16}$	150 ft.	1.35			
1	.368	.368				Straight line hanger		9	3.31			
1	.35	.35				Over suppt. rod (thrd. nuts, washers)	⅜x11 ft.	10	3.50			
		2.687	.13	1.10	2.917	Brackets complete (less one hanger)		10	26.18	1.31	11.00	38.49
	.39					Strain plates	15 in.	1	.39			
	.21					Wood strain insulators (with clevis)	9 in. E	8	1.68			
	.009					Anchor wire	$\frac{5}{16}$	400 ft.	3.60			
						Strain complete (one in 1,000 ft.)			5.67	.28	2.00	7.95
	.162		.01		.172	Trolley wire, 1,000 ft		453lb.	73.39	4.53		
	.26					Ears		9	2.34	.09		
				.007		Suspended trolley wire			75.63	4.62	7.00	87.25
						Truck or line car, 2 days on poles, 0.4 days on wire		2.4			7.50	18.00
						Finished construction		1,000 ft				$231.09



Item	Size	Quantity	Each, F.O.B.	Total, F.O.B.	F.C.W.	A. I.	Total
Chestnut poles	30′	8	3.25	26.00	10.73	26.80	$63.52
Eyebolts, nuts, washers	⅜x12″	12	0.089	1.07	0.05	.....	....
Backbone, 7 strand	¼″	480′	0.006	2.70	.90	.....	....
Pull-off, 7 strand	5/16″	450′	0.0072	3.24	1.71	.....	....
3-bolt clamps	.....	.....	.....	.....	.....	.....	....
Wood-strain insulators		40	.16	6.40			
Straight line hangers	9″ E	6	.368	2.21	.76	.....	....
Double-curve pull-overs	.....	4	.444	1.77			
V-frogs	.....	2	2.50	5.00			
Turnout (less trolley and ears)	.....	.....	......	22.39	3.42	22.70	48.51
Trolley wire, 700 ft	.....	317 lb.	......	51.35	3.17	.....	....
Ears	.....	10	.26	2.60	..10	.....	....
Suspended trolley wire	.....	.....	......	53.95	3.27	6.30	63.25
Truck or line car, 1 day	.....	.....	......	.....	.....	.....	7.50
Finished turnout	.....	.....	......	.....	.....	.....	$183.50

Detail of labor on spans, 102 splices at $0.15 = $15.30
2 frogs at 1.50 = 3.00
10 spans at .20 = 1.60
12 eyebolts at .20 = 2.40
$22.70

FIG. 5—DIAMOND TYPE TURNOUT—SPAN CONSTRUCTION

corner shows the values allowed for joint pole use, incorporating the ratios previously referred to. Of course where poles are jointly used on one side and solely owned and occupied on the other in the case of span construction, the average for the corresponding pole values applies. A similar average is taken where the poles may be iron on one side and wood on the other. Where double trolley wire was in use over single track, the extra cost (1910-1915 prices were employed throughout the entire valuation) were practically $100 per thousand feet. Proper adjustments were also made for cases where span wires were attached to buildings or bridge structures.

Having established these types, a trial of reliability was made by applying the proper types to a 2-mile rural line which the company had inventoried in great detail. The company on its own pricing claimed a value of $2,643.19 and the result of applying the types was $2,629.50. Some will be inclined to claim that the agreement is too good to be convincing.

The actual length of turnouts shorter than 400 feet was ignored, the value assigned being that for the average 300-ft. turnout; there is also little difference in cost between diamond and jacknife turnouts of that length as will be seen by reference to Figs. 5 and 6. Longer turnouts were treated as double track with turnout ends.

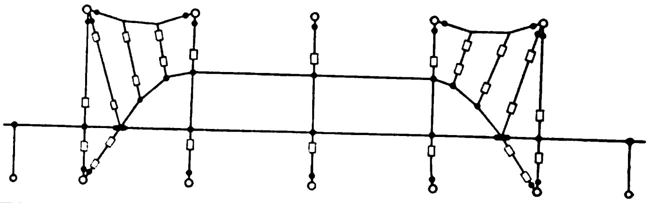
In dealing with the overhead special work, it was recognized that there would be appreciable deviation from right angles at intersections, varying length of approach and curve, unsymmetrical pole locations, etc., but the errors in averaging these factors and even in ignoring joint use of poles in connection with the special work could not accumulate to a significant total. In the case of some kinds of special work the main line mileage for the adjacent tangent construction was taken through the special work, the value of which is then the excess over tangent construction. In other cases the mileage of tangent construction was taken to and from the special work because the special work involved considerable complexity and extra poles for its support.

With the types and symbols thus adopted for the contact system (and also signals, telephones and feeders) the next move was the field inspection for the purpose of listing the construction. An inspection car with an observation end was used, so routed as to keep that end forward as much as possible, and so scheduled as to permit stops for special inspections when deemed necessary. All sorts of identifying notations were made for recording the points where the construction changed in some respect — street intersections, pole numbers, bridges, and even a letter on an enlarged state topographical map when other means failed. The following few lines will show the general nature of the simple field notes necessary to list by symbols and identify the locations of the various kinds of overhead construction:

Fairfield Avenue Line (Two blocks HTS; 1 to T.O. then 1 to end of line; both on 2-pin arms)	Distribution	Feeders
End of line to White St. T.O. (T.O. = 275 ft.)...	SSIJ$_2$WS	0
White St. T.O. to C (Map 21)...................	SSIJ$_2$WS	0
C to Fairfield Ave., double track................	SSIJ$_2$WS	1
On double track to New Britain Ave. Jnc.....	SSIJ$_2$WD	1

The point C was noted as the end of the feeder. The parenthesis refers to a hand-thrown signal and circuit. The poles were solely owned iron ones on one side and three-party joint wood poles on the other side.

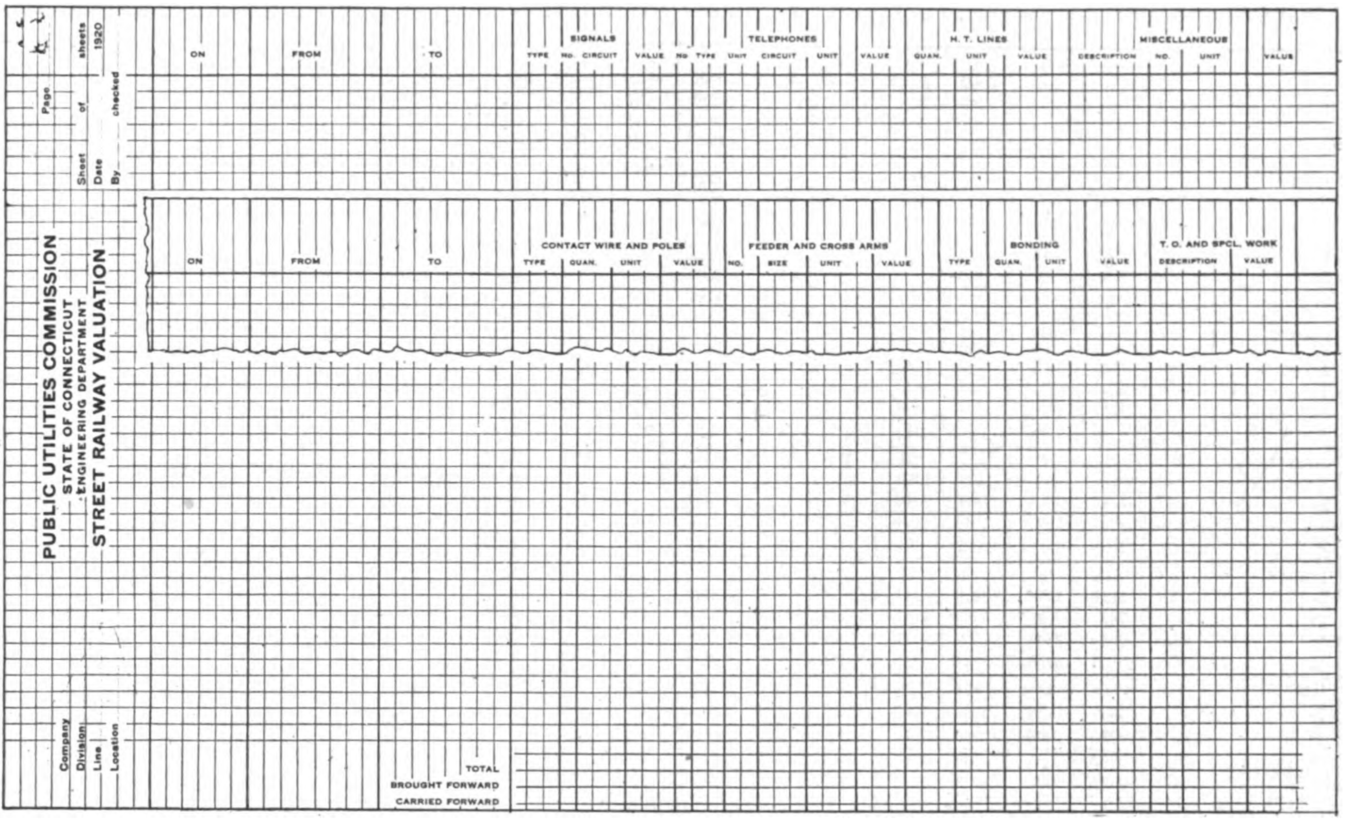
The form used for listing and totaling the contact system, feeders, special work and bonding is shown in Figure 7. It is felt that this form will give ample evidence of the possibility of ascertaining with little effort



Item	Size	Quantity	Each, F.O.B.	Total, F.O.B.	F.C.W.	A. I.	Total
Chestnut poles	30′	10	3.25	32.50	13.40	33.50	$79.40
Eyebolts, nuts, washers	⅜x12″	14	0.089	1.25	0.06	.....	......
Backbone, 7 strand	¼″	120′	0.006	0.72	0.24	.....	......
Pulloff, 7 strand	5/16″	650′	0.0072	4.68	2.47	.....	......
3-bolt clamps	.....	8	0.20	1.60	.....	.....	......
Wood strain inculators	9″E	26	0.16	4.16	.....	.....	......
Straight line hangers	.....	8	0.368	2.94	.....	.....	......
Single-curve pullover	.....	4	0.41	1.64	0.72	.....	......
Right-hand frog	.....	1	2.00	2.00	.....	.....	......
Left-hand frog	.....	1	2.00	2.00	.....	.....	......
Turnout (less trolley and ears)	.....	...	......	20.99	3.49	19.85	44.33
Trolley wire, 650 ft	.....	294 lb.	0.162	47.63	2.94	.....	......
Ears	.....	12	0.26	3.12	3.12	.....	......
Suspended trolley wire	.....	...	......	50.75	3.06	4.55	58.36
Truck or line car, 1 day	.....	...	......	.....	.....	.....	7.50
Finished turnout	.....	...	......	.....	.....	.....	$189.50

Detail of labor on spans, 83 splices at $0.15 = $12.45
2 frogs at 1.50 = 3.00
8 spans at .20 = 1.60
14 eyebolts at .20 = 2.80
$19.85

FIG. 6—JACK-KNIFE TYPE TURNOUT—SPAN CONSTRUCTION



PUBLIC UTILITIES COMMISSION
STATE OF CONNECTICUT
ENGINEERING DEPARTMENT
STREET RAILWAY VALUATION

Page
Sheet ____ of ____ sheets
Date ____ 1920
By ____ checked

Company
Division
Line
Location

ON	FROM	TO	SIGNALS				TELEPHONES						H. T. LINES			MISCELLANEOUS			
			TYPE	No.	CIRCUIT	VALUE	No.	TYPE	UNIT	CIRCUIT	UNIT	VALUE	QUAN.	UNIT	VALUE	DESCRIPTION	NO.	UNIT	VALUE

ON	FROM	TO	CONTACT WIRE AND POLES				FEEDER AND CROSS ARMS				BONDING				T. O. AND SPCL. WORK	
			TYPE	QUAN.	UNIT	VALUE	NO.	SIZE	UNIT	VALUE	TYPE	QUAN.	UNIT	VALUE	DESCRIPTION	VALUE

TOTAL
BROUGHT FORWARD
CARRIED FORWARD

FIG. 7—THE TWO FORMS USED FOR LISTING AND TOTALING ELECTRICAL PLANT OUTSIDE

the capital investment in the electrical construction for any portion of a given street-car line, of differentiating between distinctly city and rural lines, of obtaining totals for portions of the entire system not necessarily coterminous with the company's divisions as established for operating purposes, and finally of identifying at any time the location of each bit of outside plant construction and the value assigned to it. Granting also the propriety of separating the feeder and cross arms from the contact wire and poles as will be described, the method of listing also keeps distinct from the actual distribution (of localized value) the feeder system which functions primarily to supply not so much the section valued but rather the more remote sections.

FEEDER SYSTEM

The Interstate Commerce Commission classification has "Poles and Fixtures" in one account and "Distribution System" in another, but this separation interferes with an estimate of reproduction cost on a unit-of-construction basis. "Fixtures" include the cross-arms and braces and these are associated with the feeders or signal circuits and not with the contact system. "Poles," on the other hand, are necessary for the contact system even when feeders are absent. Except where the feeders follow an independent route, poles have already been included with the contact system. Cross-arms will thus appear in conjunction with the feeders, enough extra pins being allowed in excess of the feeder requirements to provide space for such signal circuits as appear. Of course feeders may be of aluminum as well as copper, underground or submarine as well as aërial, negative feeders may be used in electrolysis mitigation, many combinations of cross-arm sizes and feeder sizes are to be found, and there are always such accessories as feed taps, circuit breakers, knife switches and section insulators, lightning arresters, meters, etc., but no difficulty was found in dealing with these variations. The company had a complete set of feeder maps which were accurate or could readily be made so and these maps indicated the number and sizes of all feeders, the location of changes in number and sizes, the approximate location of feed taps and the accessories. In a few instances the actual measured length of a feeder was recorded, but in general the lengths were obtained from the mileage maps and the track and paving sheets already mentioned.

The following will indicate the allowances for cross-arm sizes with given numbers of feeders, the spare pins leaving adequate provision for the few signal and telephone circuits:

One to four feeders	One four-pin arm
Five and six feeders	One six-pin arm
Seven to twelve feeders	Two six-pin arms
Twelve to eighteen feeders, etc.	Three six-pin arms, etc.

Allowing for double-arming at corners and dead-ends the cost of four-pin arms per 1,000 ft. of feeder circuit was $14 and for six-pin arms $17. Insulators cost about $2 per 1,000 ft., as an average for all sizes of feeders.

No further progress toward reduction to types could be made than thus to standardize on cross-arm sizes for certain numbers of grouped feeders, the large number of possible combinations pointing rather toward a tabulation of individual feeder costs which could flexibly be applied to any selection likely to be encountered. Table I shows these costs per thousand feet. Two illustrations are offered as showing how this table was used for combinations not directly tabulated.

1. Seven 4/0 plus two 750,000 c.m. feeders.
2. Eight 600,000 c.m., twelve 500,000 c.m., five 4/0.

The combination (1) is treated as two groups (of three 4/0 and one 750,000) each at $960 with an extra 4/0; but two six-pin arms would be used, therefore it is necessary to increase the allowance by $6, the difference

TABLE I—COSTS PER 1,000 FT., INSTALLED, OF FEEDER COMBINATIONS

	+ 0	+ 1 2/0	+ 1 4/0	+ 1 250M	+ 1 300M	+ 1 500M	+ 2 500M	+ 3 500M	+ 1 600M	+ 1 750M	+ 1 1000M
1-4/0	160	257		345	379	508	857	1206	571	667	822
2-	307	404		492	526	656	1005	1357	718	814	969
3-	453	550	599	638	672	802	1154	1503	864	960	1115
1-250 M	199	296	395		418	547	896	1245	610	706	861
2-	384	481	530		603	733	1082	1434	795	891	1046
3-	570	666	716	755	789	919	1271	1620	981	1077	1232
1-300 M	233	330	379	418		581	930	1279	644	740	895
2-	451	548	597	636		800	1149	1501	862	958	1113
3-	670	767	816	855	889	1090	1371	1720	1081	1177	1337
1-500 M	362	459	508	547	581				774	870	1025
2-	711	808	857	896	930				1123	1318	1373
3-	1059	1156	1206	1245	1279				1471	1566	1721
4-	1408	1508	1557	1596	1630				1822	1918	2073
5-	1760	1860	1909	1948	1982				2174	2270	2425
6-	2108	2225	2274	2313	2347	2474	2823	3171	2539	2635	2790
1-600 M	425	522	571	610	644	774	1123	1471		932	1087
2-	836	933	982	1021	1055	1185	1534	1886		1343	1498
3-	1247	1344	1393	1432	1466	1596	1948	2297		1704	1909
4-	1658	1758	1807	1846	1880	2010	2302	2725		2168	2322
5-	2072	2169	2218	2207	2291	2421	2787	3136	2483	2579	2734
1-750 M	521	618	667	706	740	870	1219	1568	932		1183
2-	1028	1125	1174	1213	1247	1377	1726	2078	1439		1690
3-	1535	1632	1681	1720	1764	1884	2236	2585	1946		2197
4-	2549	2649	2698	2737	2771	2901	3250	3016	2963		3214
5-	3062	3159	3208	3247	3281	3411	3777	4126	3473	3569	3724
1-1000 M	676	773	822	861	895	1025	1374	1723	1087	1183	
2-	1338	1435	1484	1523	1567	1687	2036	2388	1749	1845	
3-	2000	2097	2146	2185	2219	2349	2701	3050	2411	2507	
4-	2662	2762	2811	2850	2884	3014	3303	3729	3076	3172	
5-	3327	3424	3473	3512	3546	3676	4042	4391	3778	3834	3989
No cross-arm; with Insulator		97	146	185	219	349	698	1047	411	507	662
No cross-arm or Ins.		95	144	183	217	347	694	1041	409	505	660

	1/0	3/0	350M	400M	700M	1" Al.	1.21" Al.	1.24" Al.
No cross arm; with insulator	79	121	252	284	475	292	403	416
No cross arm or insulator	77	119	250	282	473	290	401	414

between the cost installed of six-pin arms and four-pin arms in the thousand feet. Further the odd 4/0 feeder value is taken as $146, tabulated under "no cross-arm; with insulators," because this feeder will appear on one of the unoccupied pins of the six-pin arms. The total per thousand feet of this combination is $2,072. Group (2) is handled as:

Four 600,000 + one 4/0	$1,807
Four 600,000 + one 4/0	1,807
Nine 500,000	3,171
Three 4/0 + three 500,000	1,503
All on five six-pin arms (per 1,000 ft.)	$8,288

Above the broken line in each block of the table the total number of feeders for each combination calls for a four-pin cross-arm; between the broken and dot-and-dash line a six-pin arm; below the dot-and-dash line two six-pin arms. It should be noted that the portions of the above totals which represent the assumed cross-arms amount to percentages ranging from 1.2 per cent to 1.7 per cent and that any error in the above assumption as to number and size of cross-arms would therefore be well within 1 per cent of the over-all value.

The feeder maps were spot checked as to feeder sizes and the location, number and types of such accessories as circuit breakers, section insulators, knife switches, feed taps, etc. Bracket and span feed taps were priced separately, that one being assigned which corresponded to the contact construction in the section where it appeared. A single average length of feed wire was used with all circuit breakers and knife switches to allow for the vertical runs.

The 147 miles of circuit are shown schematically in Fig. 8. Although all this mileage is operated at 11,000 volts, three-phase, 25 cycles, some lines are insulated for 22,000 and 33,000 working volts. The fifteen different types of pole tops found are shown in Fig. 9. The conductors are of either copper (No. 4, No. 2, or 2/0) or aluminum (1/0, 2/0 or 4/0). Each of the lines, ranging from 8 to 30 miles in length, was found to be of a high degree of uniformity of type either throughout the entire length or for at least a quarter of the distance. This meant that this portion of the street railway property lent itself very advantageously to the unit-of-construction method of estimation first developed for the distribution system.

The lines were built entirely on wooden poles and these poles would at any point be the same whatever the character of pole-top construction or the character of insulators or conductors.

On the other hand, the pole-top construction would be practically independent of poles and conductors. The insulators seem to be more intimately related to the conductors than to the cross-arms. In view of these considerations the analysis was aimed toward a study independently of poles, pole tops and circuits. With the poles in place any one of the established set of types of pole tops would then be erected on these poles to support any type of circuit existing on the system.

The company had on file route maps of the lines and these were found to be accurate as to lengths of lines and numbers of poles, location of special crossings, etc., but did not give the type of pole top nor the height of the individual pole. It was therefore decided to make a quick field inspection to determine the number of poles

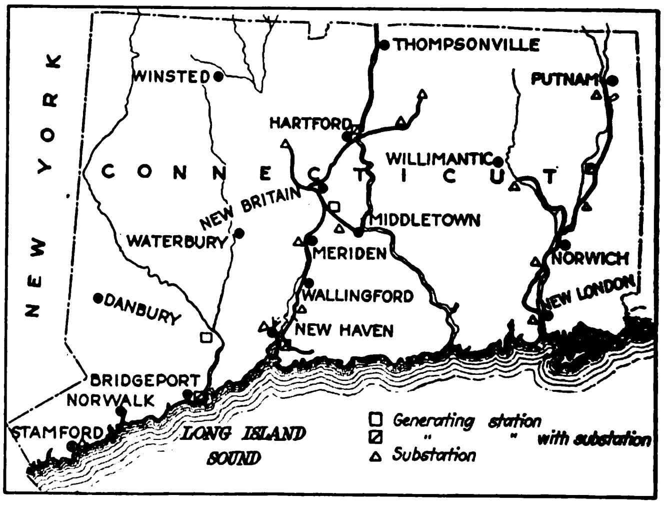


FIG. 8—TRANSMISSION SYSTEM, POWER PLANTS AND SUBSTATIONS

of each size, the number of double cross-arms (at angles, etc.), the number of special crossings (over railroads, other wire lines, etc.), the number of H-frames (at dead-ends and angles), of anchor guys, braces, head guys, and stubs. At the same time the points of transition from one type of pole top or circuit to another could be noted as well as the few irregularities not covered by type treatment.

It was found that the number of poles per thousand feet averaged 9.57, giving an average span length of 104.51 feet, and that the poles were distributed as to size as follows, 10 per cent being set in rock, the remainder in medium earth:

Pole Height, Feet	Poles per 1,000 ft.	Per Cent
35	2.04	21.27
40	5.37	56.17
45	1.36	14.25
50	.48	5.02
55	.18	1.83
60	.09	.94
65	.04	.42
70	.01	.10
	9.57	100.00

The inspection of from 325,000 to 647,080 ft. of line disclosed the frequency of incidental construction to be as follows:

Item	Total	Per 1,000 Ft.
Double cross-arms	906	1.40
Special crossings	301	.49
H-frames	18	.26
Anchor guys	663	2.03
Braces	161	.49

TABLE II—QUANTITIES OF EXCAVATION AND BALLAST FOR VARIOUS KINDS OF TRACK

Track Excavation Cubic Yards per 100 Lineal Feet

Wood Ties	Single Track							Double Track						
Class Track / Rail Height	9''	8''	7''	6''	5''	4½''	4''	9''	8''	7''	6''	5''	4½''	4''
A	77							150						
B	72	69			61	60		149	143			126	123	
C G J	50	47	44	42	39	37	36	106	100	94	88	82	79	76
D F N	58	56	53	50	47	46	44	123	117	111	106	100	97	94
K M					64	62						135	132	
Side Loc. C G J				25	25	25	25				53	53	53	53
" " D F N				33	33	33	23				70	70	70	70

Paving Excavation

Class Paving Thick	P X1 P3 P4 9''	P1 X X3 2½''	R 12''	R1 T3 R2 T4 5''	S W S1 W1 6''	X2 8''	T Y1 11''	W2 4''	P2 7''	T2 10''	Pockets Under Rail X1 W2	$\overline{VZ}$
Single Track	25	7	33	14	17	22	31	11	19	28	1.3	0
Double Track	53	15	70	29	35	47	65	23	41	58	2.7	0

Ballast

	A	A_2	A_3 A_5 A_6	B	C G J	D F N	K M	Side Location	R R Section
Single Track				22.8	0	28.4	45.1	28.4	34
Double Track	46.0	44.2	48.2	48.6	0	60.5	95.7	60.5	66

Ballast Variation - Paving not same thickness as Rail height

	Decrease - Paving Thicker						Increase - Paving Thinner						Pockets under Rail Deduct.
	1''	2''	3''	4''	5''	6''	1''	2''	3''	4''	5''	6''	
Single Track	1.95	3.9	5.9	7.8	9.8	11.7	2.8	5.6	8.4	11.1	13.9	16.7	1.3
Double Track	4.2	8.4	12.7	16.9	21.1	25.3	5.85	11.7	17.6	23.4	29.3	35.1	2.7

Assembly of the various items in these proportions gave the costs per thousand feet of poles and of each of the types of pole tops. The poles and reinforcement amounted to $211.61 per thousand feet. A thousand feet of "A" pole tops cost $32.70; of "H," $75.58, etc. A similar set-up was made for conductors and insulators.

The ten lines having a total circuit mileage of 147 (with overlap of about 6 miles) were valued at $281,463.61. After adjusting for the overlap, for joint use of poles with trolley contact circuits, and for short sections of cable, the value per mile of single circuit line averages to practically $1,900.

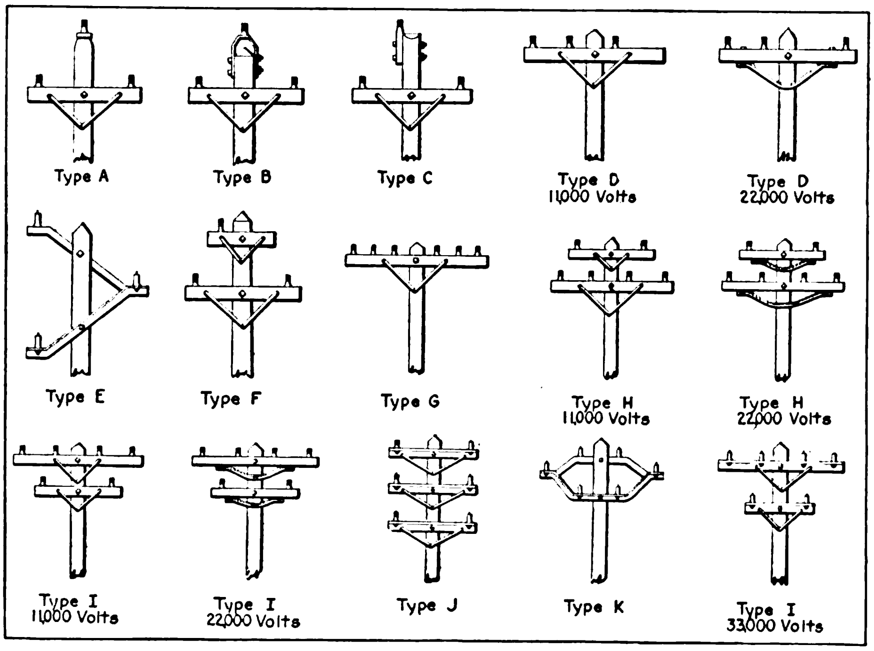


FIG. 9—TYPES OF POLE TOPS USED BY THE CONNECTICUT COMPANY

Signals, telephones and rail-bonding proved susceptible to the same general reduction to type. Signal and telephone circuits were priced on a thousand-foot basis, no allowance being made for cross-arms since spare pins for these circuits were contemplated in pricing the feeders. Four distinct types of signal devices and four telephone station types were found and the costs of these determined separately from the circuits. Similarly the cost per hundred feet of bonding each length of rail, single or double track with each type of bond, from the short U-type to the long 48 in., was tabulated and applied to each section according to the recorded bonding. It is shown that the bonding of special trackwork required special treatment.

TRACK AND ROADWAY

In attacking the problem of the track and paving costs it was found that the company's engineer of maintenance of way had records which gave in great detail the character of track construction from point to point on the system. It was based on a classification which employed a letter to indicate the nature of sub-foundation and ballast and a numeral to indicate the weight and length of rail, kind of ties and kind of joint. The listing sheets were segregated by divisions, routes and towns and gave to the nearest foot the length of each uniform combination of sub-foundation, ballast, track and paving. The points of change were identified by various methods—names of cross-streets, the approximate distance from the last named cross-street, special trackwork, railroad crossing, town line, etc. These same sheets have already been mentioned as of considerable value in determining lengths of overhead electrical construction. It has also already been stated that special trackwork was recorded by serial number on individual detailed maps giving all dimensions and such other information as was necessary for pricing purposes. No difficulty was experienced in co-ordinating the special trackwork information with that for tangent track appearing on the track and paving sheets in such a manner as to differentiate wholly between the two as to distances and values.

These records simplified the field work with reference to track to a greater extent, in proportion, than was the case with the electrical outside plant.

To reduce the tangent track construction to a type basis for the purpose of applying the "unit of construction" method of valuation, the classification established by the company was somewhat enlarged to symbolize all the elements involved. The letters adopted and their significances as to foundation and ballast are as follows:

A	Concrete mat sub-foundation
B	Telford sub-foundation
C, G, J	On native material suitable for ballast
E	On bridge
D, F, N	On sub-foundation of native soil not suitable for ballast, requiring the placing of either gravel or stone ballast. The ballast differentiates between the three letters.
K, M	Special types, one a sub-foundation of stone, the other of cinders

An excavation and ballast table (Table II) was first prepared to show the cubic yards of track excavation per hundred lineal feet of track for each combination of sub-foundation, rail height and paving. The costs of excavating for the full depth of track construction and for pavement differ and for that reason the quantities involved are shown separately in the two upper tables of the figure. The same table shows in the third subdivision the varying quantities of ballast involved with the different conditions of sub-foundations and ties. The fourth subdivision (at the bottom of the table) shows corrections to be applied to ballast quantities when the paving and its foundation are not of the same total thickness as the height of the rail. Applying the proper unit prices to the quantities for each kind of track as determined by reference to this table and tabulating, the results were then in convenient form for use in assigning costs of excavation and ballast for any combination of track and paving.

Unfortunately the numerals adopted by the company to signify the particular combination of rail section, tie and joints were not uniform for the various letter groups representing the character of sub-foundation and ballast. Thus A-1 means a 9-in., 125-lb., 60-ft. rail on wood ties and a 6-in. concrete mat foundation, the whole ballasted with stone; while C-1 means a 9-in., 84-lb., 50-ft. rail on wood ties on native soil with native soil ballast. But for the engineers of the commission to have attempted reclassification with a view to numeral standardization would have resulted in complication and delay. This accounts for the apparent inconsistency of the classification.

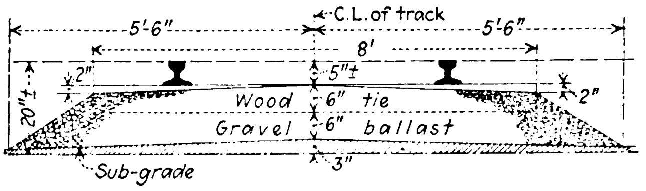
The last letters of the alphabet were used to indicate the character of paving surface, with supplementary numerals for subscripts to designate variations under the principal group:

P = asphalt V = native soil Y = wood
R = granite W = concrete Z = cinders
S = macadam X = amiesite — = no paving.

Some 160 different combinations of foundation, ballast and track were recognized and some 30 of paving. Actually over 400 different combinations of track and paving were found, but from the standpoint of cost to reproduce, so many of these were practically identical

TABLE III—ESTIMATED COST OF 100 LINEAL FEET IN VARIOUS PAVEMENTS
(1910-1915 prices)

Classification	Paving	Cost Single Track	Cost Double Track
A-1	P	541.77	1,046.82
B-2	S	368.07	723.59
C-3	V	209.53	423.17
C-3	X	238.86	485.17
D-4	R	344.92	702.00
F-4	T	295.24	601.79
H-1	P	......	1,196.46
J-15	R_1	166.80	337.71
K-2	—	254.58	522.37
M-1	Z	232.77	475.04



ESTIMATED COST OF 100 LINEAL FEET OF SINGLE TRACK

Item	Unit	Rate	Quantity	Amount
Rail—T 5 in., 80 lb., 33 ft.	Tons	$35.00	2.381	$83.34
Splices—Angle 30 in., 6 bolt	Complete	1.17	6.6	7.72
Spikes	Pounds	.02	120	2.40
Ties—native wood	Each	.65	50	32.50
Track labor	Lineal feet	.35	1.00	35.00
Ballast—gravel	Cubic yard	.60	32	19.20
				$180.16
Contractor's profit				8.75
Total				$188.91

FIG. 10—TRACK TABLE FOR TYPE J22

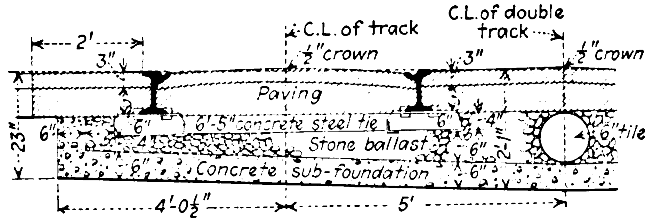
TABLE V—PAVEMENT CLASSIFICATION

Class	Thickness	Foundation	Surface
P	9 in.	6 in. concrete	2½-3 in. asphalt
R	12 in.	6 in. concrete	Granolithic Block
R_2	5 in.	Earth	Granolithic Block
S	6 in.	Macadam	Macadam
T	11 in.	6 in. concrete	Brick
V		Earth	Earth
W	6 in.	6 in. concrete	6 in. concrete
W_3	6 in.	6 in. hassam	6 in. hassam
X	2½ in.	Stone	Amiesite
Z		Cinders	Cinders
		No paving (open track)	

TABLE IV—TRACK CLASSIFICATION

Class	Sub-Foundation	Ballast	Ties	Weight	Rail Section	Length	Joint
A-1	6 in. Concrete	Stone	Wood	9 in., 125 lb.	P. S. 273	60	C 12 bolt
B-2	Telford	Stone	Wood	9 in., 84 lb.	L. S. 229	60	C 8 bolt
C-3	Earth	Earth	Wood	5 in., 80 lb.	P. S. 251	60	L 6 bolt
D-4	Sand and Gravel	Stone	Steel Conc.	6 in., 100 lb.	P. S. 163	60	Continuous 6 bolt
F-4	Earth	Stone	Wood	7 in., 70 lb.	P. S. 206	30	C 8 bolt
H-1	Concrete Beam	None	Wood	9 in., 104 lb.	P. S. 260	30	Lorain Weld
J-15	Gravel	Gravel	Wood	4¼ in., 56 lb.	P. S. 51	30	L 4 bolt
K-2	Stone	Stone	Wood	4½ in., 70 lb.	Beth. 37	30	L 6 bolt
M-1	Cinders	Cinders	Wood	4⅝ in., 70 lb.	P. S. 237	30	L 4 bolt

In the "joint" column, a channeled joint bar is indicated by "C," an angle bar by "L": the number of bolts employed also appears in this column.



ESTIMATED COST OF 100 LINEAL FEET OF DOUBLE TRACK

Item	Unit	Rate	Quantity	Amount
Rail—G.G. 9 in., 125 lb., 50 ft., 60 ft.	Tons	$40 00	7.440	$297.60
Splices—Channel, 32 in., 12 bolt	Complete	2.75	8	22.00
Tie rods—7. ft. centers	In place	0.43	27.2	11.70
Ties—steel concrete, 6 ft.	Each	5.00	32 6	163.00
Track labor	Lineal feet	.55	200	110.00
Concrete sub-foundation	Cubic yard	5.00	36 0	180.00
Excavation—paving	Cubic yard	1.75	53	92.75
other	Cubic yard	.80	81	64.80
Drainage—6 in. V.T. pipe	Lineal feet	.20	100	20.00
—catch basins	Complete	30.00	0.17	5.10
Ballast stone	Cubic yards	1.20	44.2	53.04
				$1,019.99
Contractor's profit				71.49
Total				$1,091.48
Paving—Asphalt on concrete	Square yards	2.14	211	451.54

FIG. 11—TRACK TABLE FOR TYPE A2-P

that it was found easily possible to reduce the necessary number of standard types to 50. To indicate the nature of a few of these combinations and the corresponding costs per hundred lineal feet of either single or double track, Table III is given.

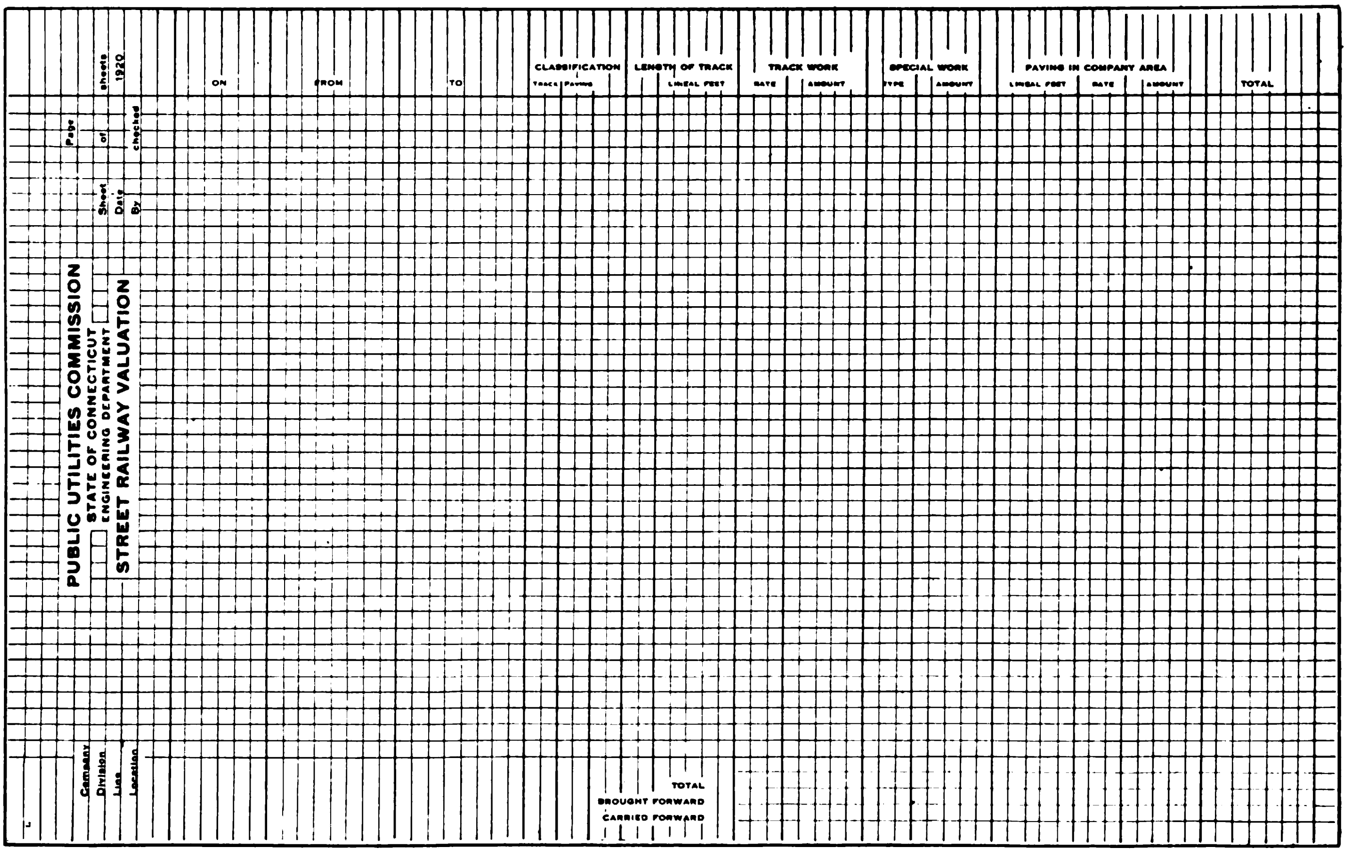
In addition, Table IV exhibits the separate details of excavation, ballast and track, and Table V shows the details of paving.

As an indication of the manner in which the over-all cost of the fundamental combinations of track and roadway were assembled there are given two examples out of the 50 standard types. One (Fig. 10) is an inexpensive rural track and the other (Fig. 11) an expensive city track and pavement.

It is naturally not possible in an article of this length to give the costs and quantity data in any greater detail, but it is believed that enough has been set forth to indicate that the value of the track and roadway investment can by this method be estimated with a minimum of approximation. In addition it is possible to list the property with its assigned value in such a way as to permit absolute identification of each stretch of track in the pricing sheets, as sample shown in Fig. 12. This is similar to the electrical overhead listing sheets, Fig 7.

CONCLUSION

Some of the aspects of the ordinary physical valuation questioned in the former article were the cost, the length of time taken, the uncertainty as to labor costs in connection with the multiplicity of small items, and the inflexibility of the summary as to rational apportionment of the total value among subsequent subdivisions of the property. Superior in the mind of the writer to these objections to an expensive detailed appraisal is the insignificance of appreciable variations in the physical totals when it comes to the actual determination of the reasonable rate. It is felt that the method outlined in this and the previous articles avoids most of these objections and has in addition the advantage, at least in connection with the outside plant, of identifying the location of each piece of valued property and thereby assuring that the errors of omission are at a minimum. Even though the cost of making this appraisal was no more than 10 or 12 per cent of what a detailed-count appraisal would have cost, those who ordered the work as well as those who performed it felt confident that the totals arrived at are just as reliable as if the larger amount had been spent.



PUBLIC UTILITIES COMMISSION
STATE OF CONNECTICUT
ENGINEERING DEPARTMENT
STREET RAILWAY VALUATION

Page ___ of ___ sheets 1920
Sheet ___ Date ___ By ___ checked ___
Company ___ Division ___ Line ___ Location ___

ON | FROM | TO | CLASSIFICATION (TRACK, PAVING) | LENGTH OF TRACK (LINEAL FEET) | TRACK WORK (RATE, AMOUNT) | SPECIAL WORK (TYPE, AMOUNT) | PAVING IN COMPANY AREA (LINEAL FEET, RATE, AMOUNT) | TOTAL

TOTAL
BROUGHT FORWARD
CARRIED FORWARD

FIG. 12—FORM USED FOR LISTING AND TOTALING TRACK AND PAVEMENT

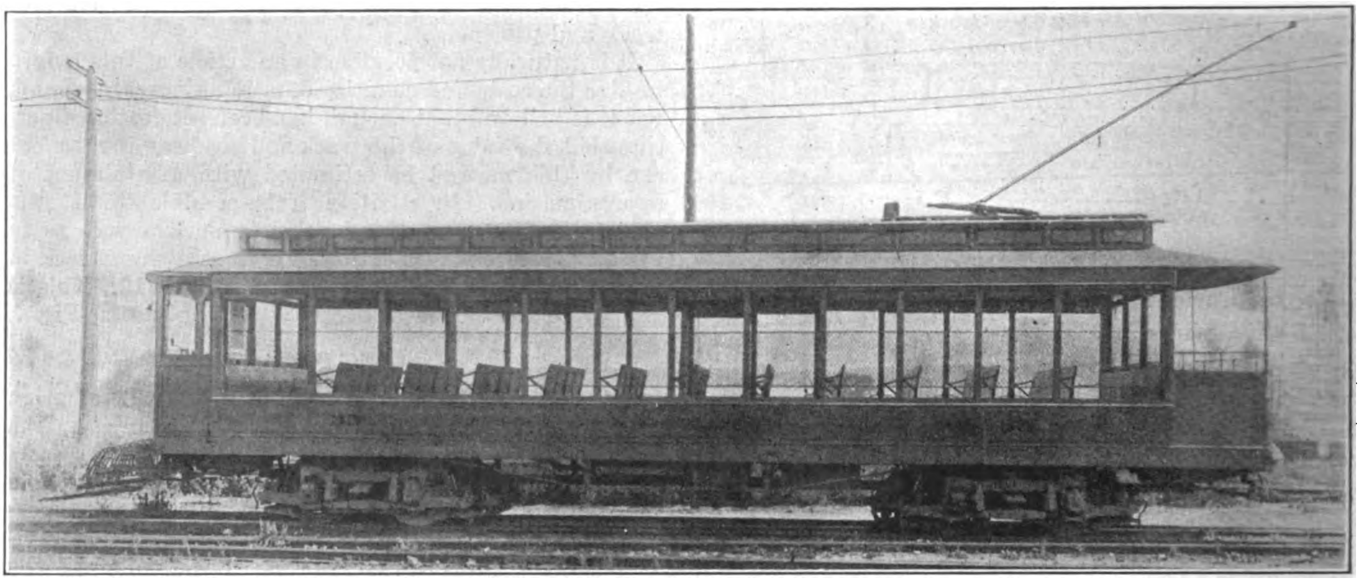


FIG. 1—NINE TRAILER CARS OF THIS TYPE WERE REMODELED BY THE NEW YORK STATE RAILWAYS INTO FRONT-ENTRANCE, CENTER-EXIT CARS

Adapting Cars to Transportation Requirements

New York State Railways Is Gradually Changing Over Rolling Stock to Provide for More Efficient Passenger Interchange and Fare Collection—Latest Examples are Cited

DURING more than four years just past the mechanical department of the New York State Railways has been carrying out a consistent program of remodeling the rolling stock used on the Rochester, Syracuse, Utica and Oneida lines. War and post-war conditions interfered with the continuity of the process, but remarkable results have been accomplished under the direction of J. F. Uffert, superintendent of equipment, and the local master mechanics.

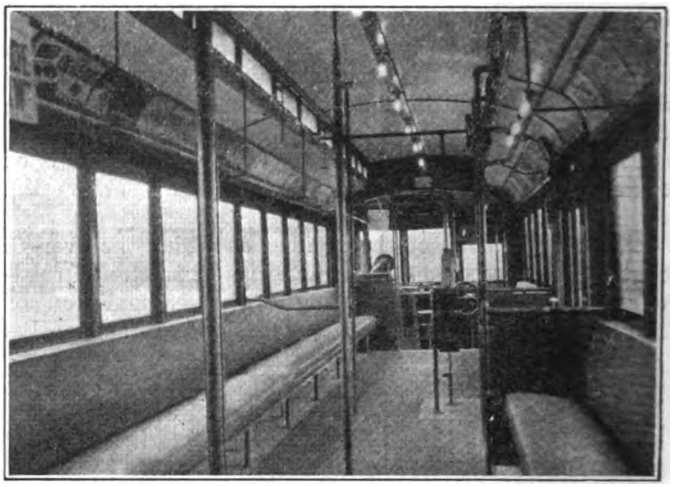


FIG. 3—INTERIOR OF THE FIRST CAR REMODELED FROM TRAILER TO FRONT-ENTRANCE, CENTER-EXIT TYPE

The earliest and largest job was that inaugurated in Rochester in April, 1917, covered in an article in this paper in the issue for April 20, 1918, page 773. The most interesting recent two jobs are the making over of some open-bench cars into those of the front-entrance, center-exit type and the remodeling of a batch of motor cars into trailers. "Before and after" pictures of the first of these jobs are reproduced in Figs. 1 and 2, and interiors are shown in Figs. 3 and 4. As the New York State Railways operates a number of cars of the Peter

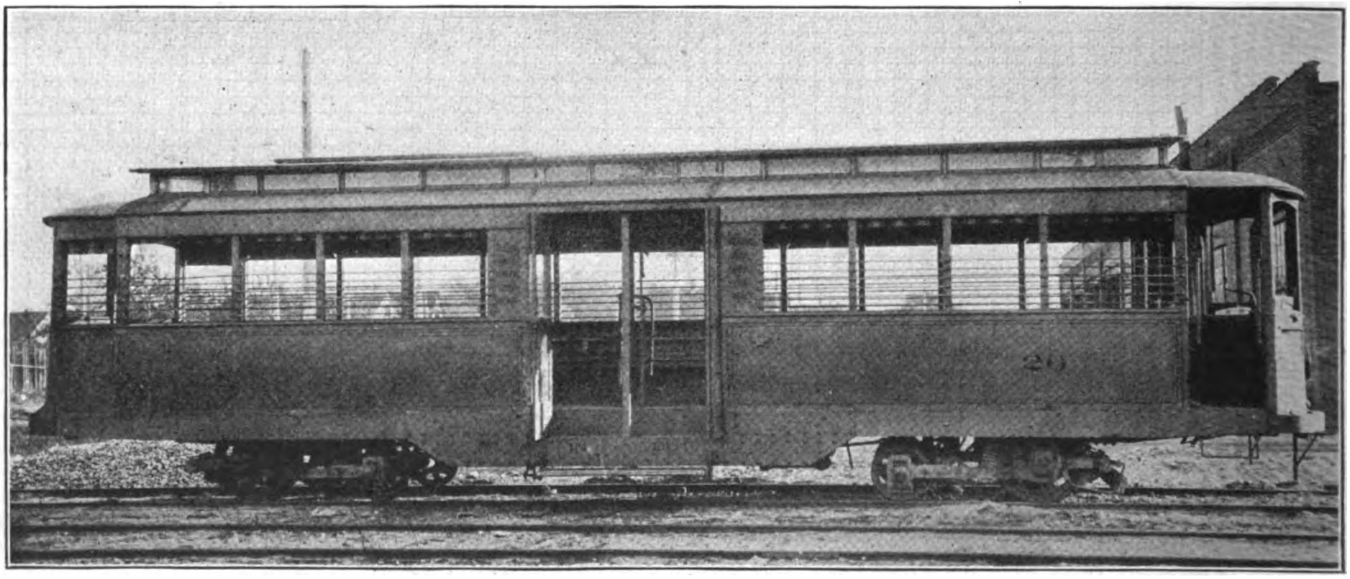


FIG. 5—ONE OF FIFTEEN CENTER-ENTRANCE MOTOR CARS MADE OVER INTO CENTER-ENTRANCE TRAILERS

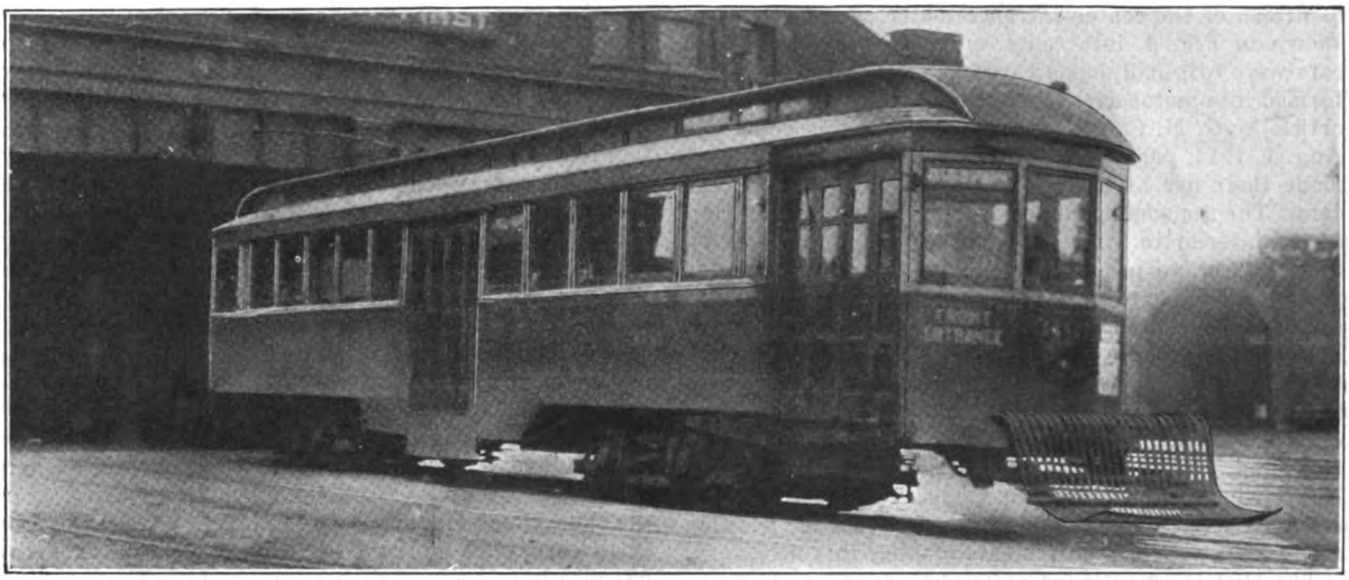


FIG. 2—THIS IS THE FRONT-ENTRANCE, CENTER-EXIT CAR MADE OVER FROM THE OPEN TRAILER ILLUSTRATED IN FIG. 1

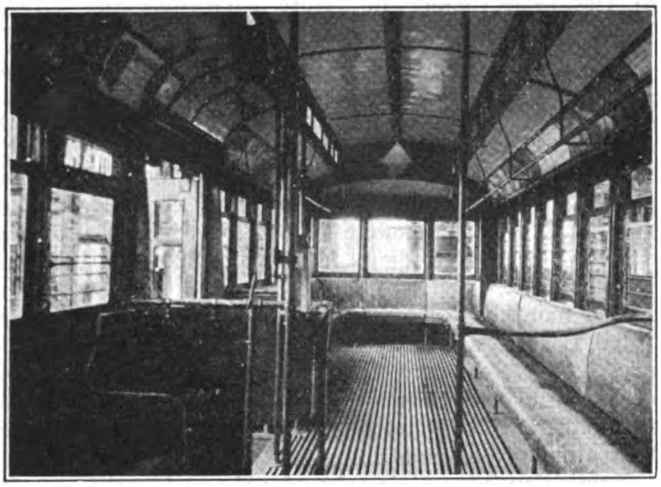


FIG. 4—INTERIOR OF REMODELED CAR EMBODYING IMPROVEMENTS OVER THE SAMPLE CAR

Witt type (see issue of this paper for Jan. 19, 1918, page 120), the experience with which has been highly satisfactory, the present remodeling is a logical development. Advantage has been taken of several years of operating experience with these cars on the property to incorporate into the present cars the latest ideas in regard to details.

The old open cars were of very light construction, in fact the underframing was so light that sagging had occurred at both ends. It was necessary to reinforce the underframe, which was done by transferring the original ⅝-in. x 8-in. steel plates from the entrance side to the devil-strip side, thus nearly doubling the strength of the sill there, and putting in a ½-in. x 12-in. plate to reinforce the sill on the entrance side. The interior arrangement was made similar to that on the company's other front-entrance, center-exit cars.

Figs. 3 and 4 show some differences in regard to windows, hand rail and floor. The interior shown in Fig. 3 is that of the first of the nine cars remodeled. This has stationary window sash and the floor is slatted crosswise. In Fig. 4 the features of difference are the movable sash equipped with fittings, the handrail offset over the seats and the longitudinally slatted floor.

The cost of this job was about $1,650 per car.

The second job is also illustrated in "before and after" fashion in Figs. 5 and 6. This involved the making over

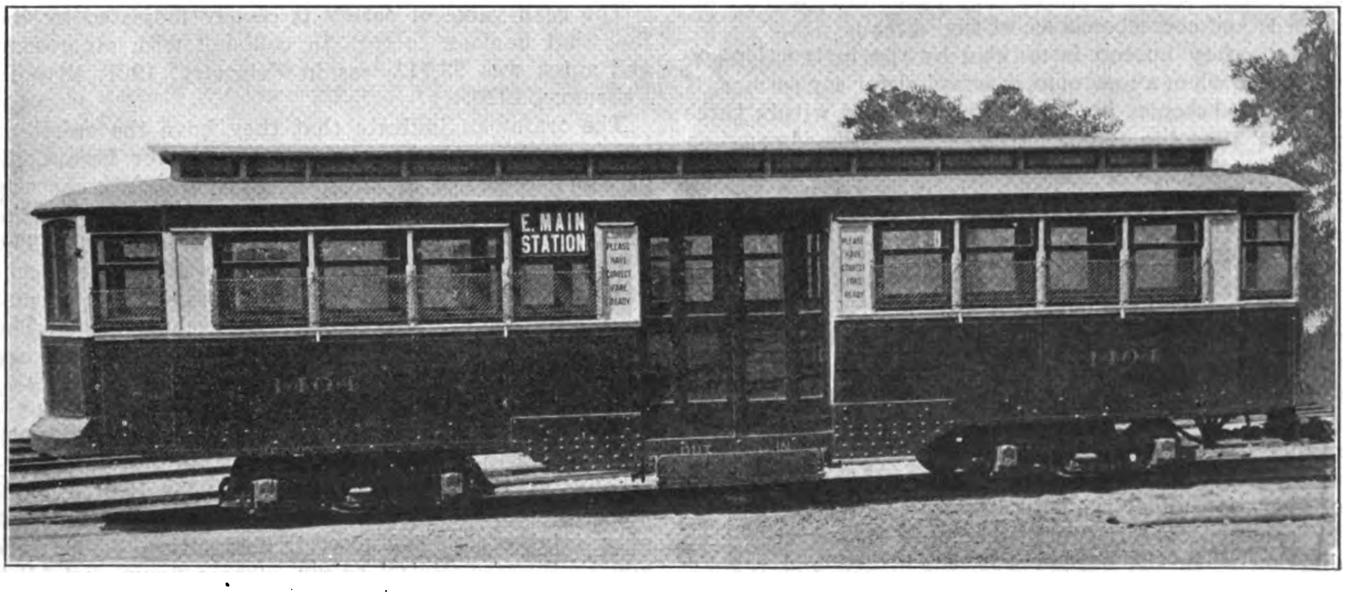


FIG. 6—THE FINISHED CENTER-ENTRANCE TRAILER MADE FROM A CENTER-ENTRANCE MOTOR CAR

of fifteen of the center-entrance motor cars of the type shown in Fig. 5, into center-entrance trailers. These cars were originally open cars but they had been transformed into motor cars for supplementary service. (See article by G. M. Cameron in the issue of this paper for Aug. 1, 1914, page 216.) Present operating conditions made their use as trailers preferable to use as motor cars. The remodeling comprised principally the refitting of the interior to utilize the full seating capacity (now fifty-three); to provide stanchions for convenience of passengers in boarding and alighting, and to standardize the window sash and fittings. In addition Peter Smith hot-air heaters were installed; the hand-brake and air-brake equipment was revised, the space under the seats being utilized for all possible elements of the braking system; couplers were added; the cars were completely repainted, and last, but not least, Taylor trucks with 26-in. wheels were installed. The Taylor trucks are designed to accommodate motors to provide for possible changes in service requirements making this necessary.

The changes mentioned reduced the car weight from 27,000 to 22,000 lb. They cost about $2,200 per car, the subdivision of items being approximately thus: Shopwork, $800; air-brake equipment, $400; trucks, $1,000.

Accomplishments of a Safety Bureau

Accidents Involving Responsibility of Trainmen Materially Reduced—The Same Is True of Damages to Other Cars and Automobiles

BY J. G. JEFFERY
Director of Public Relations Los Angeles Railway

AN EXTENSIVE safety campaign embracing close co-operation between trainmen, the riding public and traction officials has resulted in a marked reduction of all classes of accidents on the Los Angeles (Cal.) Railway. Particularly gratifying results have been obtained in lowering the number of accidents in which the company could be held liable. This safety work has been under the direction of a Safety Bureau created Oct. 1, 1920.

The bureau staff consists of a supervisor of safety, who closely analyzes all accident reports to determine the particular classes of accidents that need special attention, and a traveling supervisor of safety, who spends the greater part of his time on the cars observing operation and instructing trainmen. Two clerks handle the records and correspondence of the bureau.

The safety bureau is notified by the instruction department when a new man is accepted for car service. If such man becomes involved in an accident within three months' time the safety bureau notifies the instruction department when investigation shows the trainman at fault in any degree. A man is then detailed by the instruction department to ride with the new trainman to check up his abilities for safe operation.

When accident reports indicate continued carelessness or inefficiency on the part of a man in service more than three months he is either called to the office and the matter discussed with him or the traveling supervisor of safety rides with him on the car. The latter method has proved highly beneficial. It gives the trainman a chance to show actual difficulties as they occur and the safety expert an opportunity to show correct methods of operation under the actual traffic conditions.

Trainmen's safety committees were organized in each division when the bureau was established and regular meetings were conducted at the carhouses. These meetings for a time brought forth good suggestions, but were later abandoned as they were inclined to develop more controversy than actual beneficial suggestions. However, those that were interested in safety were invited to visit the headquarters of the bureau and discuss features of accident prevention. One of the features of the company's weekly publication are articles by the traveling supervisor of safety prepared in interesting style and in trainmen's language.

Under the company's merit system, upon which the Christmas bonus is based, credits are given for good safety suggestions and for reports of dangerous conditions. This helps particularly in keeping rolling stock in proper mechanical repair. There is also a special award of ten credits for a month's clear safety record.

A gratifying degree of co-operation from auto drivers has resulted from carrying large signs on the dashers of all cars reading, "Autos turn out; we can't." At the same time pointed safety reminders were printed on small cards and hung in the cars. The safety bureau has also been successful through the Los Angeles chapter of the National Safety Council in enlisting the co-operation of the local civic bodies. As an indication of the improvement in safety conditions the safety bureau has compiled the following figures:

The daily average number of accidents in 1920 was forty-eight. In the first half of April, 1921, the daily average was thirty-seven. In March, 1920, there were 1,400 accidents, but in March, 1921, there were only 1,250. This reduction was made with more than 100 cars added in the year. By way of comparison the records of the Automobile Club of Southern California show 1,108 auto accidents in March, 1920, and 1,925 in March, 1921.

The monthly accident records from Dec. 1, 1920, to April 1, 1921, are as follows: December, 1,648; January, 1,480; February, 1,150; March, 1,250. The gain of March over February is partly due to the difference in number of days and also to a general choice of runs by trainmen that month.

Particular interest is taken by the claim department in the reduction of the percentage of accidents for which crews were entirely or partly responsible. On March 20, 1920, trainmen were responsible for thirteen out of the day's fifty-one accidents, as compared with no responsibility for the forty-seven accidents on March 21, 1921.

The cash value of safety is clearly indicated by the fact that damage to cars in collision with other cars and autos was $3,712 less in February, 1921, than in February, 1920.

The trainmen indicate that they have the spirit of safety first to a greater degree than ever before, all of which is shown in the inter-division safety contests which are held to determine the right to display the "Premier Safety Division" flag from their flagpole. The trainmen are now engaged in a ten weeks' safety contest. A "Safety" pennant is to be awarded for permanent possession to the winner of each contest. The scores are compiled like baseball percentages and are based on past records of the risk of the various routes.

An exhaustive investigation carried on by the Society for Electrical Development to ascertain the facts concerning fires which occurred in the year 1919 in communities supplied with electric service showed that out of a total of 138,553 fires in 345 cities, 3,568 were apparently of electrical origin. These figures establish a percentage for electrical fires of only 2.57.

Retrospect and Prospect*

Railway Pioneer, After Recounting in His Franklin Institute Address the Steps Already Taken in Applying Electric Power to Railways, Expresses the Conviction that There Are Large Opportunities Ahead for Further Developments in This Field

By FRANK T. SPRAGUE
New York City

A RECENT announcement states that in the United States alone electric railways cover a trackage of 44,000 miles and represent a capital investment of approximately $5,000,000,000, while 300,000 men are employed and over 14,000,000,000 passengers are carried annually, ten times as many as are carried by the steam railroads of the country. In addition there is the like class of roads in foreign countries and thousands of miles of trunk lines here and abroad which are electrically operated or for which electrical equipment is planned.

This is a brief epitome of one of the most astonishing of industrial growths, the product of but a third of the century near the beginning of which Faraday, "late bookkeeper's apprentice, now turned philosopher," revealed his discovery that it was possible to produce mechanical motion through magnetic action, an announcement which was followed ten years later by Henry's announcement of his invention of a crude motor.

But Henry knew that as long as the source of energy was a zinc-burning battery, coal could not be replaced. It fell to Thomas Davenport, a blacksmith of Brandon, Vt., to throw himself heart and soul into the attempt to create an industrial revolution, efforts necessarily failing if for no other reason than lack of a suitable source of power. But to him, in all justice, must be given the credit of first proposing, in a small model, the idea of an electric railway and of being granted the first broad patent as early as 1837.

Two years later there appeared in an Edinburgh publication on "Railways" the confident prophecy: "We have no hesitation in saying that electromagnetism will at no distant date compete with steam as a motive power, and successfully."

But it was eight years later before that splendid old scientist Prof. Moses G. Farmer operated at Dover, N. H., a small car carrying two passengers, to be followed four years later by Professor Page's trip with primary batteries on a road near Washington.

All the experiments of this period were, of course, doomed to commercial failure, not alone because of the crudity of the motors but because the source of power was a primary battery. They were, however, indicative of what would come later when the evolution of the modern dynamo had taken place.

Another ten years passed, when Pacinotti's invention of the continuous-current dynamo marked the birth of the modern electric machine, followed, in 1866-67, by the almost simultaneous announcement from English, German and American sources of the remarkable property of self-excitation by energy built up from the latent magnetism in the iron of the field magnets.

At the end of the decade, in 1870, the Frenchman Gramme brought out his improvement on the Italian's valuable invention and produced the first commercial machine for continuous-current operation, this machine being later superseded by the Hefner-Alteneck drum or surface-wound armature, invented also by Rowland.

Then came a discovery declared by Maxwell to be the most important of modern times, the reversibility of function, that which made it possible for the same machine to be used either as a dynamo for converting mechanical energy into electricity or as a motor to convert electricity into power, with the necessary corollary, the electric transmission of energy by coupling two such machines together in the same circuit.

It is said that Pacinotti discovered this also, but this is not an established fact, while it is certain that Gramme demonstrated it at the Vienna Exhibition in 1872 after its possibility was disclosed by a workman's mistake in coupling up a machine to the circuit. Here were at hand all the essentials of a successful beginning of electric railway experiments, but years went by until a quarter of a century had elapsed since Farmer's and Page's experiments.

Then came the crude suggestions of Greene, a poor mechanic of Michigan, who was afterward allowed a very broad patent, and the early plans of Field, who conceived in San Francisco the idea of replacing the cable by electric power. At the Berlin Exhibition in 1879 Siemens made the first public demonstration of a motor pulling a passenger car and operated with a third-rail supply and track return from a continuous-current dynamo-electric generator. This was followed by other exhibitions and then by the equipment of a one-car line at Lichterfelde, opened for traffic in May, 1881. This was the first line put into service.

In 1880, and again in 1882, Mr. Edison experimented with short electric railway lines at his laboratory in Menlo Park, later joining hands with Field in a company which never got beyond the experimental stage and did no commercial work whatever. A patent interference between Siemens, Field and Edison resulted in Siemens being ruled out because his foreign work was not admissible, and a patent was granted to Field, but in terms which proved unsupportable.

SPRAGUE LEAVES THE NAVY TO ENTER ELECTRICAL WORK

In this latter year the writer, then a naval officer on duty in London as a member of a jury at the Crystal Palace Exhibition, proposed a complete system for the Underground Railways, this being followed by a plan for operation with an under-contact overhead trolley following the lines of all tracks and switches, and with rail return. But after resigning from the naval service he devoted himself at first to problems in electric lighting as Mr. Edison's assistant and then to the development of industrial motors through his own company until 1885, when he announced plans for equipping and operating the New York Elevated.

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*Abstract of address at meeting of Franklin Institute, Philadelphia, Pa., on occasion of award of Franklin medal to Mr. Sprague.

During this period there was a renaissance of activity in electric railway development, Van Depoele, Daft and others installing a number of small installations. That by Daft on the Hampton branch of the Baltimore Union Passenger Railway in 1885 was the first railroad regularly operated by electricity in this country. Daft's other most ambitious work consisted of experiments carried on on the Ninth Avenue Elevated Railroad in New York in 1885 and 1888 with two electric locomotives named the "Ben Franklin."

In 1885 the writer, before the Society of Arts in Boston, outlined for the Elevated a new project, to comprise motors carried on the trucks, geared directly to the axles, and with provision for regenerative action and electric braking, following this announcement with important experiments for several months at the Durant Sugar Refinery and on the Thirty-fourth Street Branch of the Elevated, in 1886, where he demonstrated his wheelbarrow method of motor suspension, dual control, regenerative braking and the interpole winding on two motors carried on a truck underneath the car body.

These tests were followed by several with storage-battery cars in various cities, but this method of operation, while promising, has never been able generally to compete with the system of direct supply.

At the beginning of 1887 there were in the entire world nineteen installations, nearly equally divided between Europe and the United States. These aggregated about 60 miles of track and less than a hundred motors and motor cars, and they exhibited the widest variations in equipment and operating characteristics, none of them serving as an acceptable type for adoption. In short, the art was in a chaotic state, and something was necessary to demonstrate that the infant had a manhood ahead of it.

Richmond Road Nearly Doubled World's Electric Rolling Stock

Fortunately that opportunity came to me, and the modern trolley with its sequence, electric traction in general, may be fairly said to date from the installation of the Richmond road, the contract for which was taken in May, 1887. We had little to show save a blueprint and a few crude machines, but faith was strong and the contract was taken under terms, price and guarantees easily placing it in the "knave or fool class," the designation applied by a scientist to Daft's project two years before in Baltimore.

The contract called for the completion in ninety days of the equipment of a road having about 12 miles of track, at that time unlaid and with the route only provisionally determined; the construction of a complete steam and electric control-station plant of 375-hp. capacity, and the furnishing of forty cars with eighty motors and all the appurtenances necessary for their operation. This was nearly as many motors as were in use on all cars throughout the rest of the world. Thirty cars were to be operated at one time, and grades as steep as 8 per cent were to be mounted. Finally, the payment was to be $110,000 "if satisfactory."

Fortunately for the future of electric railways the difficulties ahead could not be foreseen, otherwise the contract might never have been closed. But disheartening as these were, great as was the expense incurred and grave as were the risks encountered, they were justified by the results, for the Richmond road, by common consent, stands as the prototype in almost every essential detail of the modern electric trolley system, and its installation marked the real beginning of the great industry of electric traction.

The history of the Richmond road has been too often written to make it necessary now to dwell upon it at any length. Suffice it to say that after experimental runs in the latter part of 1887 it was put into commercial operation in the beginning of February, 1888, and for a year there followed an experimental period of development which taxed the resources of the company to the limit.

Pope, in a historical sketch read before the Electric Club in 1891, was appreciative enough to say: "Laboring under enormous difficulties and drawbacks, Sprague succeeded by the completion and operation of this (Richmond) plant in establishing beyond peradventure the future supremacy of the electric street railway, and many of the characteristic features at that time designed and introduced by him have practically become standards in the modern system and are found in nearly every one of the thousands of cars now in service."

Among the characteristics were the main and working conductors and feeders, the bonded rails and earth return, the universal-movement reversible trolley in the center of a car, double-end control, axle-suspended motor, series-parallel grouping, variation of field resistance, fixed end-contact brushes and lightning arresters.

The road soon commanded the attention of Henry Whitney of Boston, who soon afterward abandoned his cable projects and adopted electricity.

Richmond's early troubles were buried under a loss of $75,000, fully compensated in the subsequent growth of a great industry.

The use of the tracks by the trolley system accentuated the already serious trouble of the telephone companies, who were also using grounded circuits, and then followed a country-wide legal fight as to earth rights claimed by the telephone companies. The result was a foregone conclusion and eventually they adopted metallic circuits, for which compulsion they can thank the trolley.

Horse Railway Electrification Enters Acceleration Period

The ensuing two years was a period of extraordinary activities, the Sprague company and the Thomson-Houston company, which had succeeded the Van Depoele company and which followed generally the Sprague practice, contracting for over two hundred roads. In Italy, at Florence, and in Germany, at Halle, the first modern roads also were installed on the Sprague system.

As typical of municipal efforts the slogan of a mass meeting called in New Orleans is illustrative. It was: Lincoln Set the Negroes Free! Sprague Has Set the Mules Free! The Long-Eared Mule No More Shall Adorn Our Streets.

Then came the consolidation of the Sprague with the Edison General Electric Company, and a gradual improvement in, and increase in size of apparatus. Form-wound armatures, proposed by Eickemeyer, replaced irregular windings and metallic brushes gave way to carbon, this single change, initiated by Van Depoele in 1888 and 1889, going a long way toward making the art a success. Cast and wrought iron yielded to steel, two-pole motors to four, double-reduction gears to single, and open motors to closed ones protected only by their own castings. In 1892 the combined series-parallel and resistance control was adopted, when the Thomson magnetic blowout was successfully applied to controllers by Mr. Potter and proved a most effective agent in reducing the troubles of operations.

Limited for a time in extent of operation by the standard of voltage adopted, the invention of polyphase alternating-current transmission, the transformer and the rotary by Ferraris, Tesla, Stanley, Bradley and others, widened out the field by making possible the economies of high-tension transmission, with the advantages of direct-current distribution and motors.

Meanwhile, a few locomotives were built, but to follow steam precedents seemed a pitiful falling short of the possibilities of electric equipment and operation and having developed a system of electric elevators with secondary switch control it suddenly flashed upon me that I could apply a like principle to railway operation; that is, make up trains at any length by the combination of car units, wholly or partly equipped with motors and with train lines, without regard to number, end relation or sequence, and to control such trains from either end of any car by a master switch connected to the common train line.

This idea, sketched quite fully on a scrap of paper, marked the complete birth of this new method, then named and now everywhere known as the "multiple-unit system." Its great possibilities instantly absorbed my interest, for I saw the opening of a new epoch in electric railway operation. Here was a way to give a train of any length all the characteristics of a single car, with every facility of operation demanded by the most exacting conditions of service and capacity, and with like control of any number of locomotives.

EPOCH-MAKING MULTIPLE-UNIT INSTALLATION ON CHICAGO ELEVATED

After two years' abortive attempts to get the privilege to demonstrate at my own expense the advantages of the system in New York, the opportunity suddenly arose in Chicago, where I was called in consultation on the South Side Elevated Railroad. Here, just ten years after the contract for the Richmond road, I took one for operating an extensive elevated equipment under conditions even more onerous and with, perhaps, less to show in a tangible way.

As I was called to London in connection with an extensive elevator contract for the new Underground Railroad then under construction, plans for operative tests were restricted in time and development, but on July 16, 1897, after but a few weeks' preparation, two cars were put into operation on the tracks of the General Electric Company, at Schenectady, and on the 26th, the half century anniversary of Professor Farmer's test of a model electric railway at Dover, my ten-year-old son operated a six-car train in the presence of the officers and engineers of the road.

There were, of course, troubles a-plenty, but by the following spring the entire equipment of 120 cars was in regular operation and every steam locomotive was out of service.

The multiple-unit system is now, the world over, an essential fundamental for all electric train operation where two or more equipped cars or locomotives are controlled from a common source, and its value in dense rapid-transit service like that in the subways in New York is indicated by the enormous increase of capacity compared with any other method of operation, a practical result which could not be equaled in any other way on the New York subways alone for less than $100,000,000 increased capital cost of construction.

HEAVY ELECTRIC TRACTION NEXT IN ORDER

Following a serious accident in the yard tunnel of the New York Central Railroad, the first step in America in main line electrification was taken when electricity was adopted for operation at, and for some distance from, the city terminal. And here again there was a radical departure in engineering practice, proposed by Mr. Batchelder.

Up to that time all motors used for railway purposes maintained a fixed relation between the armature and the field, but the locomotives adopted here were bipolar, the fields being supported by the locomotive frames, while the armatures were on the axles and free to move vertically with reference to the flattened field poles. Brackets and gears were thus dispensed with and the machine reduced to the simplest elements.

The assumed limitations of direct-current motors, with which I was in entire disagreement, and the development in alternating-current apparatus, led many engineers to predict the complete supremacy of the latter, in accordance with which belief single and polyphase and combined-phase roads were installed in America and Europe, the most notable here being the Great Northern polyphase and the New Haven single-phase, and in Europe certain Swiss and Italian roads. The controversies which arose were unduly bitter and were based very largely on the assumption that all the apparent merits claimed for single-phase operation should be accepted, even without trial, as a basis, while the possible advances in the rival direct-current system were ridiculed.

The coming of the interpole motor, a modification of the old Sprague Elevated Railway experimental type, put a new aspect on the controversy. Direct-current potentials were promptly increased, first to 1,200 volts, then to 2,400 volts and higher. The largest trunk-line installation thus far undertaken, that of the Chicago, Milwaukee & St. Paul Railroad over the Great Divide and the Cascade Mountains, is operated at 3,000 volts, while experimental operation has reached 5,000 volts.

In England the direct current has been officially adopted for future railway equipment, on the report of a special commission, and a like influential French commission has indorsed the same system after an extended investigation of the work done in the United States.

Despite the enormous advances made and the results accomplished in electric railway development, it would be folly for the electrical engineer or the railroad man to assume that the limit of invention or improvements has been reached. The urban and interurban fields, with the constant linking up of smaller into larger systems, go on expanding, but the trunk lines are still largely steam operated, although there are many thousand of miles here and abroad, on great systems, for which electric operation has been decided in the future. There is still a wide difference of opinion among engineers as to whether a single system will be dominant, and if so, which one, or whether the varying conditions and operating demands will be best met by specific solutions.

The financial question involved in the large cost of equipment cannot but remain a factor which will often prove controlling, for electrical operation will generally be adopted only where there is a commensurate gain of some kind. Where coal at low unit cost is available the gain in economy alone will not warrant the adoption of electricity on independently operated roads, but where the coal is high in price, or may be unavailable, while water power can be had at a reasonable cost, there is a valid reason for change.

Excluding special cases, what will ultimately be constructively influential is the need of increase in existing or available track capacity, which is undoubtedly possible to a system which permits of individual and simultaneous control of a concentrated or distributed power plant greater than can be got by any other means and can eliminate from its tracks the transportation of its fuel. It seems certain, however, that there must be co-operation in the important matter of power supply, and the whole trunk-line problem will appear less formidable with the elimination of the requirements of installations of individual power houses, with their necessary reserves, and the use of current from great industrial power houses properly linked together, which, in addition to their reliability, can make full use of the diversity factor in a multitude of demands.

Chicago's Transportation Problems

Aspects of Steam Railroads and Rapid Transit Service Considered by Various Speakers at the Spring Meeting of the American Society of Mechanical Engineers Held at Chicago

SIX papers on this topic were presented at the spring meeting in Chicago of the American Society of Mechanical Engineers, May 23 to 26. In the first paper J. R. Bibbins, Chicago, gave reasons for the growth of the freight traffic in Chicago. These are that the city is the principal east-west divisional transfer point between east and west railroads; it is the northern railhead of the Mississippi Valley roads and is the water gate for the interior via the Great Lakes route. The individual railroads have chosen individual terminal development to a large extent, but all the principal local freight terminals are within the one-mile zone downtown.

In a second paper E. J. Noonan discussed the possibility of a more intensive use of railway property through the development of air rights and suggested among other things two-level type freight stations with double-deck streets.

A third paper by Hugh E. Young spoke highly of the container system and declared that the motor truck can never take the place of the rail carrier for long hauls and cannot handle carload freight business in an efficient manner.

A fourth paper by Messrs. Bibbins and Noonan gave particulars of the existing Chicago electric freight tunnel, which is at present handling approximately 1,800 tons of l.c.l. freight, although its capacity is possibly five times that amount. The tunnel now has about 65 miles of line and $15,000,000 investment. A study of the reasons for this comparatively small use shows that some of the reasons are avoidable and some not. A study of the existing union tunnel freight stations shows the following results on design:

1. Platform stations required 25 sq.ft. per ton per ten-hour day.
2. Service track required one standing car per 10 tons handled per day.
3. Average load per car 1.4 tons general merchandise.
4. Team platform length 0.42 lin.ft. per ton per day.
5. Elevator capacity thirty round trips per hour now, thirty-six maximum when speeded up.
6. One thousand-ton station requires 25,000 sq.ft. of floor space, 420 lin.ft. of platform frontage, 1,260 ft. of standing track, two elevators, ninety merchandise cars.

The conclusion of this paper is that from the standpoint of the city of Chicago no transportation agency could be more effective in solving the problem of existing track capacity, and no effort should be spared to make this institution one of permanent success.

The fifth paper, by Mr. Bibbins, describes the points to be considered in a terminal survey. The sixth and last paper is by Bion J. Arnold and it is entitled "The Relation of Steam Roads to Rapid Transit Development." An abstract follows:

The Relation of Steam Roads to Rapid-Transit Development

By Bion J. Arnold
Chicago, Ill.

THE time has come for steam railroads entering large cities, especially those who are fortunate enough to own entrance rights-of-way strategically situated for long-haul suburban traffic, to enter the rapid-transit field and enter it properly.

The case of Chicago may be analyzed briefly for illustrative purposes. While Chicago is territorially a big city, 200 square miles in area, with commuter suburbs extending 15 to 20 miles in all directions, its business center is highly concentrated within a so-called "loop" (eight times ten blocks), wherein is conducted the major portion of the wholesale, department store, high-class shopping, theater, restaurant, club, business and centralized social activities of the city. Twenty-six railroad carriers enter this central district over twelve major trunk lines with a traffic of 1,340 trains and 195.-000 passengers per day. All this business is concentrated in five passenger stations, which are clustered around the boundaries of the Loop and as close in as the price and competitive condition of property permitted at the time when the stations were originally located.

None of these, with the exception of the Illinois Central development, is especially adapted for the economical and quick handling of commuter or rapid-transit business. On the other hand, they are distinctly ill adapted for handling the large growth in future traffic which will undoubtedly come. There is no intercommunication between them and consequently they must necessarily remain as traffic "dumps," rather than as traffic distributers.

The Illinois Central lake-front system alone approaches the ideal of a rapid-transit distributing system, with stations distributed along the boundaries of the business district instead of concentrated at one point.

The statement is frequently made by railroad executives, and without refutation, that the commuter rapid-transit business does not pay or is carried at a large loss which must be made up by the long-distance overland passenger and freight business. If this is true, the railroad managements of the country, which are confronted with the problem of adequate revenue, stand in the inconsistent position of harboring a passenger-terminal system and conducting a public service at the expense of the stockholders or the other patrons of the system. Either aspect, if true, represents an unstable economic condition which cannot last. And if the commuter traffic is not in fact supporting the full cost of producing this service, there is no better time than the present for the railroads to establish the facts in the case and endeavor to have this traffic handled in a more practicable manner.

TRUNK LINES SHOULD CO-OPERATE IN TRANSIT PLANS

However, there are some who believe that railroad accounting has not yet been sufficiently perfected to reveal fully the equitable allotment of terminal and service charges as between long-distance and local rapid-transit service on the steam railroads. Those who defend the use of the monumental terminals claim that they would be required in any event for cross-country travel and that the rapid-transit service can therefore be accommodated at very little cost off hours, as a by-product. But this is hardly the case in a large community such as Chicago, for the rapid-transit peak practically coincides with the main-line peak, especially in the morning when overnight travel reaches the city. Still it is claimed that this commuter travel should not bear the same operating costs and fixed terminal charges per passenger as the overland traffic because the suburbanites use relatively few of the main-station facilities. Whether this is true or not, it is believed by many engineers in railroad service and in civil life that some careful and thorough research into the economics of railroad suburban-passenger business should be instituted at once, with the specific object of finding out whether the railroads could better handle it or should turn it over to some other agency better organized for the purpose.

The hopeful plan in mind seems to be that the steam railroads which are so strategically located with respect to long-haul, suburban commuter traffic should undertake an immediate reorganization of this great arm of local transportation and co-ordinate its services with the other surveys of the city in such a way that unified operation of the entire local transportation business may be carried on with the least total expense and maximum usefulness.

The Law of Electrolysis

Analysis of Fifty-three Higher Court Decisions Bearing on the Subject Condensed in a Compact Form Which Will Make It of Interest to Railway Men

IN A RECENTLY published pamphlet Samuel S. Wyer, consulting engineer, Columbus, Ohio, discusses at length some of the legal phases of the electrolysis problem under the title "Analogy of Responsibility for Damages from Leaking or Stray Electric Currents from Electric Railroads to Adjudicated Responsibility for Damages from Leaking Water, Oil or Gas, Noxious Gases or Sparks."

In the introduction the author defines the term "stray current" and explains why stray currents are likely to be destructive agents. He also lists the various classes of underground property most likely to be affected by stray currents. In another part of the report, which is also devoted to the technical side of the question, the more important damages or causes of damage are given as: Fire hazard due to arcing between pipes in a building; gas explosions caused by stray currents igniting gas in basements, manholes, etc.; damage to water pipes, telephone and power cables and metal work in underground structures.

It is assumed in the discussion that the following engineering facts have been established:

1. There will always be some current leakage where a grounded return circuit is used and this leakage can be measured.
2. Stray currents injure underground metallic structures where they leave such structures to go into the soil.
3. Proper mitigating methods will so reduce the leakage as to render it not dangerous.
4. The double-trolley system would eliminate all stray currents and stray current troubles.
5. The cost of elimination or mitigation is not prohibitive considering the hazard which is to be guarded against.

COURT RULINGS ON ELECTROLYSIS

In the discussion of the legal phases it is pointed out that there have been only three important electrolysis court decisions: Manufacturers' Natural Gas Company vs. Indianapolis Street Railway, Dayton vs. City Railway, and Peoria Water Works vs. Peoria Railway. The bulk of the discussion is devoted to an analysis of the pertinent portions of fifty-three important higher court decisions bearing on responsibility for damage from leaking water, gas, oil or noxious gases and sparks. Of these decisions there are one by the United States Supreme Court, one by the British House of Lords, one by the British Privy Council and thirty-one by the supreme courts of various states. The several decisions are arranged chronologically, beginning with a decision of the New York Supreme Court in 1856. In each case the quotation from a decision is followed by what is termed a "stray current analogy"; that is, a statement of what would have been said had the same line of reasoning been applied to stray electric currents. The final conclusion reached is that the old legal maxim "Every man has a right to use his own property as to himself seems proper, but he must be careful so to use it that no injury is done to another" should and can be applied to responsibility for damage from electrolysis or other stray current injury.

The pamphlet is of interest to railway men chiefly because it condenses in a compact form a large number of legal decisions bearing on the stray current problem. It may be pointed out that the same decisions also have some bearing on the legal phases of the inductive interference problem, which of late has been so important in connection with the increasing density of electric power and communication service. The decisions quoted all bear on the fundamental law of the land as it pertains to the rights and duties of the fee simple owners of real property.

There is no analysis of those problems pertaining to the rights of the public in connection with public utility properties nor of those where both parties involved are using public property by virtue of an easement right.

Constantinople Tramways

STREET railway service in Constantinople was stopped in December, 1918, and was gradually resumed beginning March 5, 1919, reaching normal in June. The fares are five times as great as before the war.

Some rolling-stock ordered in Europe has been received and many cars are being rehabilitated. According to the *Revue Générale de l'Electricité*, from which these notes are taken, the exchange rate has been a severe handicap to the railway system.

Trackless Trolleys for New York

Department of Plant and Structures Specifies Details of Trolley Bus to Be Operated on Staten Island in Connection with Municipal Trolley Line

THE city of New York, through its board of purchases, has asked for bids for seven electric motor-driven trackless trolley cars. These are to be put in operation by the department of plant and structures in connection with the municipal trolleys now in operation on Staten Island. The routes for operation will be from Meier's Corner to Linoleumville, and from Manor Road and Schmidt's Lane to Sea View Hospital. The bids were advertised on May 7 and were scheduled to be opened on May 23.

The cars are to be of the semi-open type and equipped for one-man operation. All structural steel shapes, rivet steel, castings, etc., are to be in accordance with the A. S. T. M. specifications. The contractor is required to deposit $1,000 to cover the cost of inspection during construction.

The completed car must be able to travel with a load of 10,000 lb. over New York City thoroughfares without showing evidence of weakness and excessive heating in any part. Tests must also be made by the contractor to conform to all rules and regulations of the New York Public Service Commission and other city and state departments having jurisdiction. Broken parts due to defective design, materials or workmanship are to be replaced without expense to the city for one year.

Some of the requirements of the chassis frame are that it is to be of 6-in. channel section, weighing not less than 13 lb. per foot, properly reinforced with hot-riveted gussets at all corners and intersections of cross members. The front axle is to be of I-beam section, of 3.5 tons capacity, equipped with ball-bearing steering head and roller-bearing spindles. The rear axle is to be of 2.5 tons capacity, fitted with worm drive and full ball bearings, and with internal brakes of 18-in. diameter. Spindles are to be 2.75 in. diameter. The front springs are to be 50 in. long and 3 in. wide with eleven leaves, while the rear springs are to be 56 in. long, 3 in. wide, with fifteen leaves.

A steel body is specified, constructed with steel uprights and rolled steel carlines, all joints to have gussets and to be hot riveted. The body below the window sill is to be paneled with ⅛-in. "Steelosote" and so arranged as to be easily replaced in case of damage. The roof covering is to be "Steelosote," in sections shaped to conform to the contour of the roof structure. The floor is to be tongued-and-grooved maple and covered with rubber inlaid tile flooring.

The main entrance and exit door is to be located on the right-hand side, of the two section folding type and operated by a hand lever. An emergency door, fitted with a collapsible folding step, is required at the rear. Plate-glass windows of the best D.T.A. car glass, mounted in brass window sash with detachable rubber weather strips, were specified, as were also Pantasote window shades with rollers and car fixtures.

The carrying capacity of the car is to be thirty seated passengers, with standing room for ten additional. The aisle-way is to be 24 in. Cross seats, 30 in. wide, with steel seat frames fitted with Marshall spring cushions and backs trimmed with No. 1 machine-buffed genuine leather are to be used. In the roof is to be an exhaust ventilating system, and a buzzer signal system is included for convenience of passengers.

Each car is to carry one 25-hp., 600-volt, direct-current motor of the box-frame commutating-pole, self-ventilating, ball-bearing type. The forward end of the armature shaft is to be tapered to fit a standard universal coupling on the drive shaft. The opposite end of the armature shaft is to be equipped with a direct-current generator to charge an 80-amp.-hr. storage battery for marker and emergency lighting.

The type of control specified is of the rheostatic (K) type with five points arranged for foot operation, hand operation being for use only in emergency. The reversing feature is to be the same as in any standard K-type railroad controller. The positive line is to carry a standard railroad-type circuit-breaker while the negative side of the circuit is to be fused.

The drive from the motor to the rear axle is to be through a tubular propeller shaft fitted with universal joints at both ends. The steering gear is of 3.5 tons capacity, compounded at a ratio of 2.5:1 and fitted with a 22-in. handwheel. Or, instead of the axles, drives and motors specified above, truss axles, internal gear drives and multiple motors may be used. The capacity of axles and drives and the aggregate power of the motors, however, shall not be less than already specified. Internal gears shall have not less than two gears bearing on the driving gear.

DETAILS OF EQUIPMENT

Regular foot and emergency hand brakes, following automobile design, and a 12-in. foot gong are to be furnished.

Front and rear wheels are to be of the American cushion type, with solid rubber tires. They are to be 36 in. in diameter, with a 6-in. tread, and made of second-growth hickory.

The electric heaters specified must provide an even distribution of heat throughout the car with a maximum power consumption of approximately 6 kw. and have an arrangement for three temperature graduations of 2 kw. each. Heater wiring is to be in conduit under the car body and in molding inside.

The main lighting circuit is to carry ten round, 110-volt, 23-watt-type lamps mounted in flush-type receptacles, and the emergency lighting circuit, operated from the storage battery, is to consist of four 6-volt 15-cp. lamps in special dome fixtures. There are to be two 6-volt, 21-cp. headlights and two front and one rear 6-volt, 4-cp. marker lights. All headlights and markers are to operate from the storage battery.

The trolley-pole collector, or pole head, is to be of the sliding type for use with a wire spacing of 14 in. It is the intention that operation shall usually be in but one direction, but provision is made in the design for operation in the reverse direction for short distances at low speed. Another requirement of design is that if the pole head leaves the wire it will not cause a short circuit due to metal parts spanning the two wires. The shoes or contact parts must be renewable, have a liberal contact surface and be fitted with grooves for retaining a lubricant.

Requirements also call for an adapter fastened to the pole head and a trailing rail contact shoe so as to make it possible to operate the car at slow speed on a 600-volt grounded return circuit.

The trolley pole must be sufficiently rigid to force the pole head or contactor against the trolley wires at a normal working upward pressure of 36 lb. Provision must also be made against short circuit if the pole crosses both trolley wires, and two No. 4 extra flexible insulated cables suitable for carrying 600-volt power are to be used for conductors.

The trolley base is to be of the hand maneuvered type, provided with slip rings so that the pole can be rotated. All bearings are to be of the roller type. The top thrust bearing is to be so constructed that the lubricant cannot leak out on the car roof or down the maneuvering mechanism. Another provision is that the pole head must keep in contact with the trolley wires should the car turn out for another to pass. A buffer spring is required to absorb upward blows in case the pole leaves the wire, with a latch to lock the pole socket in a horizontal position during removing or installation of trolley poles. The maneuvering mechanism is to be of such construction that the operator can rotate, raise or lower the pole without leaving his seat.

Supports are to be provided for a fare box which can be placed at various angles and so held stationary. Finally, the regulations for painting call for the most thorough and careful method known for passenger cars with the special object in view of providing a rust-inhibitive coating. The exterior finish is to be full oil gloss and white enamel for the interior. The paints used must follow New York City specifications.

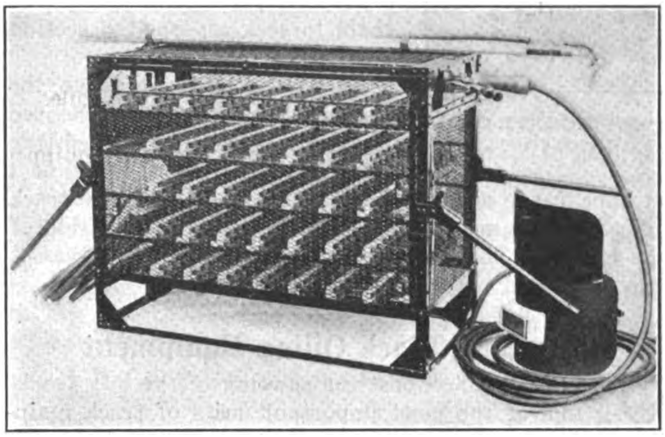
New Resistance-Type Arc Welder

A NEW electric arc welder, called the "Ajax," is being placed on the market by the Railway Track-Work Company, Philadelphia, Pa. It consists of special wire resistance coils supported on insulator bars which are mounted on a frame of steel angles. A switchboard for controlling the current is mounted at one end of the frame.

The type of machine which is recommended for railway work weighs approximately 100 lb., and is 18 in. x 36 in. x 36 in. in size.

The designers of this machine have given special consideration to high current capacity, accessibility of parts, ventilation and portability. The wire used in the resistance coils is a special grade of very high resistivity adopted after several years of tests and experiments.

A control mechanism, consisting of a line switch by means of which current can be cut off from all the coils, is mounted on one end of the framework. At the opposite end the switchboard for regulating the current is mounted. A shunt switching device provides for short-circuiting a portion of the coils where large currents are required. By this arrangement control over several groups of coils is made independently of the other groups. The switchboard provides for thirty-six values of current.


NEW RESISTANCE-TYPE ARC WELDER

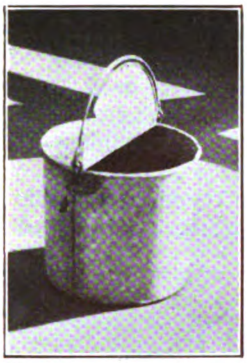
Several plugs are provided for attaching the lead wires to the machine. These plugs have wooden handles to protect the operator from shocks and also to prevent short circuits.

Just After Lunch at the Wethersfield Carhouse

This Large Group Indicates the Success of the Joint Meeting of the Two Organizations Which Resulted Largely from the Efforts of I. A. May, Past-President of the New England Street Railway Club. See Last Week's Issue for Details.

NEW ENGLAND STREET RAILWAY CLUB
CONNECTICUT COMPANY SECTION A.E.R.A
HARTFORD CONN. MAY 18 1921

Closed Buckets for Track Oilers



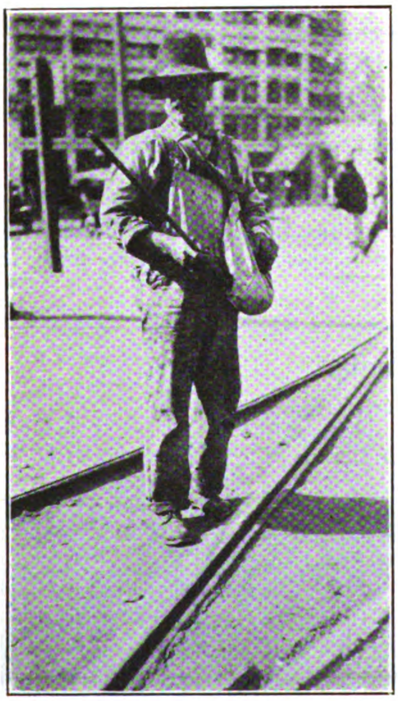
COVERED TRACK-OILING BUCKET

IT USED to be the case on the Pacific Electric Railway that frequent complaints arose about track oilers traveling around on city cars with oil buckets. Oil running down the sides of the buckets offered an opportunity to mar or ruin the clothes of passengers, even though the oilers' instructions required them to seek an isolated section of the car.

To remedy this condition the engineering department devised a closed type, galvanized-iron oil-carrying bucket. It is neat in appearance and when properly handled by the track oiler there is no chance of spilling oil over the side of the bucket. There is an opening in the lid so that it may be closed without removing the brush.

Practical Track Oiling Equipment

ON THE Pacific Coast the sanding of the city tracks is one of the most important units of track maintenance because of frequent heavy fogs and light misty rains. The engineering department of the Pacific Electric Railway has employees who are held responsible for the sanding of the tracks.



SANDING BAG USED ON CITY TRACKS OF PACIFIC ELECTRIC

For efficiently handling this element of maintenance work, particularly when the sanders are given an emergency call during foggy weather, they are equipped with an open-top sanding bag constructed of heavy canvas cloth and provided with straps which go over the shoulders. Attached to the bottom of the bag is a piece of rubber hose 6 in. in length with a ¾-in. opening. An iron tube 3 ft. in length, with a ¼-in. opening, is carried by the sander, who inserts the tube in the rubber hose section when he wishes to begin operation.

When the conveyor tube is not in use, the flow of sand is shut off by merely raising the piece of rubber hose. Likewise, when the sander desires to cease sanding, he merely elevates the iron conveyor tube without detaching it. The benefit of this practical sand bag is its simple arrangement, which makes its operation efficient and economical and which permits work to be handled with dispatch, especially in congested localities.

Association News

Important Meeting of Way Matters Committee

THE committee on way matters held an enthusiastic two-day meeting at association headquarters on May 18 and 19. The meeting indicated that the report of the committee will contain much information on live subjects dealing with track and roadway maintenance.

Among the members present were R. C. Cram, chairman; C. A. Alden, V. Angerer, W. R. Dunham, Jr., E. B. Entwisle, H. H. George and E. M. T. Ryder. Others in attendance on invitation were W. P. Day and F. H. Ogden, International Steel Tie Company, Cleveland, Ohio; H. L. Whittemore, United States Bureau of Standards, Washington, D. C.; G. C. Farkell, National Tube Company, Lorain, Ohio; F. A. Weymouth, Bethlehem (Pa.) Steel Company; W. J. Sheehy, East Rochester, N. Y.; W. W. Wysor, United Railways & Electric Company, Baltimore, Md.; E. F. Hartman, Crotexol Corporation, and S. W. Dannett, Rail Welding and Bonding Company, New York City.

Among the subjects on which definite action was taken for inclusion in the final report were design of curved treads for girder and girder guard rails, method of determining brittleness in rails which entails a change in the specifications for girder rails, a new specification for rail-bound insert special trackwork, and a comprehensive investigation on arc-weld joints, the report on which will contain many data and illustrations.

The Bureau of Standards again expressed a willingness to co-operate in forming a special committee to undertake tests of all forms of welded joints. The way committee recommended that the special committee consist of the following representatives: One each from the Bureau of Standards, the University of Illinois, the manufacturers of welding materials and the American Bureau of Welding and two from the Engineering Association.

In connection with the study of substitute ties the International Steel Tie Company presented a treatise on its form of tie which explained all the details of construction. A model of a pressed steel substitute tie, recently patented, was also shown by the inventor, W. J. Sheehy. A progress report will be made on this subject and reassignment asked for the ensuing committee.

The sub-committee appointed to study curved contour for wheel treads, jointly with the committee on equipment, will submit a progress report. It was the sense of the way committee that the present data are not sufficient to prove or disprove the theory that the curved wheel tread would be worthy of adoption. Continuance is to be asked for the ensuing committee.

A list of approved standards was presented and will be suggested to the committee on standards for submission to the American Engineering Standards Committee.

A progress report, with tables and appropriate information, is to be included in the final report of the committee on clearance curves as a matter of information. The sub-committee on standardization of frogs and track centers in special trackwork layouts presented a report on standard turnouts and crossovers which also amends various specifications now in the Engineering Manual as to frog angles, frog-arm lengths and radii of switches and mates.

A report on wood preservatives covering a number of important specifications for creosote oils and other preservatives and methods of preservative treatment of timbers was accepted. It will be published as a separate paper and will cover the joint report of the three principal committees involved. Mention to that effect will be made in the annual report of the way committee.

Chairman Cram is to outline for the benefit of the secretary his views as to research work that can be done by the experiment station of Illinois University on welded joints and curved wheel treads.

Merchandising Transportation Committee Meets

THE T. & T. Association committee on merchandising transportation met at association headquarters on May 20 to discuss the subject in hand preparatory to completion of the report to the coming convention.

Among those present were V. L. Lloyd, Cleveland, representing J. H. Alexander, chairman; W. H. Boyce, Beaver Valley Traction Company; K. A. Simmons, proxy for M. B. Lambert, Westinghouse Electric & Manufacturing Company, and J. W. Welsh, acting secretary. Letters from several other members of the committee reporting on the subject assigned were available for discussion.

In reviewing the subject of courtesy of train crews, it was brought out first that courtesy begins at home and it is necessary to instill this fact first in the minds of the supervisory force. Meetings with this class of employees usually produce the desired result. With the trainmen themselves, however, it takes more than mere meetings at which some official talks to obtain the necessary interest. Letters to the men at their homes have produced better results than notices posted on bulletin boards. These letters, if followed up with individual instructions, soon get the men into such a frame of mind that some good merchandising can be done. Suggestion sheets for improvements in service and equipment should also be mailed to the trainmen, instead of being left where they can be had when wanted. Such a time never seems to come, but if the sheets are sent to the homes they are more likely to be used. If the men's suggestions are used the writer should be so notified.

Other means of enlisting the aid of employees outlined at the meeting were noonday talks, posters at division points and issuance of pamphlets. The spoken word, however, was considered to be by far the best method if the speaker had a message that his audience wanted to hear. An indirect means of accomplishing some good results is the company publication, which can be read at home.

Discussion also brought out that the electric railways should participate in all community activities supported by civic organizations that benefit the territory served. Advertising through the local boards of trade and chambers of commerce where community affairs are largely discussed by all interested are also indirectly of much benefit.

Letter to the Editors

Baltimore Wants Separate Entrances and Exits with One-Man Cars

UNITED RAILWAYS & ELECTRIC COMPANY

BALTIMORE, MD., May 19, 1921.

To the Editors:

While not desiring to enter into a controversy concerning the merits of the present standard Birney safety car, there is one point that seems to me has not been given due emphasis in the discussion that has taken place. This is the fact that because a car will operate in smaller places, such as Terre Haute or some medium sized city in the Southwest, it does not mean that it is the most efficient design for operation in larger cities, under the conditions of heavy traffic which exist there.

The best proof of the need for another design of a one-man car with more adequate passenger interchange facilities is actual operation. Here in Baltimore we equipped one heavy transfer line with one-man safety cars of standard design, and increased the service 50 per cent when the new cars were put on. These cars replaced a single-truck car, seating thirty people, equipped with longitudinal seats and with 5-ft. platforms. Notwithstanding the greatly improved service furnished with the safety cars, we found it necessary to lengthen the running time during the peak hours in order to keep the cars on time.

There has been some complaint on the part of the public, particularly during rush hours, because of the delays due to loading and unloading the cars, to the narrow platforms and to the congestion that inevitably occurs at the front of the car. This latter was intensified because many people were using the car for short transfer rides and would not go to the rear, because they wished to alight a short distance from where they boarded.

We feel that the one thing that made the car at all successful was the large increase in service. This "acid test" proved to our satisfaction that under such conditions of heavy traffic the present design of the one-man car is not adequate. Therefore, when we recently purchased ten additional cars, we specified a wider platform which provided separate exit and entrance passageways in order to prove out our ideas, and if these cars operate as we feel they will, future one-man cars on this property will be provided with the wider platforms.

Thus it will be seen that in order to consider the public and to give it efficient, satisfactory service the present type of standard one-man car was not adequate. Further, we of the industry should be careful not to jeopardize the great advantages of one-man car operation and risk the possibility of losing these advantages through failure to please the public, just because of the arguments being put out at present for holding to a single design, without recognizing the fact that this design is not suitable for all conditions of electric railway traffic.

L. H. PALMER,
Assistant to President.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wages Cut in Cincinnati

Eighteen per Cent Reduction Effective July 1 Accepted by Trainmen at Referendum

An agreement was recently entered into between the Cincinnati (Ohio) Traction Company and its union employees, members of the Amalgamated Association, whereby an 18 per cent reduction in wages will go into effect on July 1. Readjustment to the new basis was accepted by the men by a vote of 832 for and 606 against.

The new contract will expire on June 30, 1922. The new and the old rates of pay in cents per hour follow:

Motormen and conductors	Present	Effective July 1, 1921
First three months....	54	45
Next nine months.....	57	48
Thereafter	59	50
Curve cleaners	45	32
Car tenders	45	32
Watchmen	45	30
Electric shovel operators	65	52

Barn men, uniform reduction of 20 per cent
Time and one-half for overtime, both periods

There were no important changes in working conditions, except that the men have heretofore been paid at the rate of twelve minutes' time for each accident report made out. Under the new contract they will not receive any additional time for this.

The new arrangement was made following conferences attended by W. Kesley Schoepf, president of the railway; officials of the local union and W. D. Mahon, president of the Amalgamated Association. In connection with the agreement it is significant to note that the contract was entered into voluntarily and without arbitration more than a month before the old contract expired.

LARGE SAVING MADE

It is estimated unofficially that the new scale will save the Cincinnati Traction Company a total of between $400,000 and $500,000 in wages in a year. The deficit which has accumulated under the present franchise up to May 1 is $806,427, according to figures of W. Jerome Kuertz, Street Railway Director. Under the terms of the franchise fares cannot be reduced until this deficit is wiped out and a surplus of $650,000 has been built up. The railway has a fund of $400,000 held inviolate which would be applied to accumulation of the $650,000 surplus. Therefore, before fares can be reduced the company must gain $1,056,427, or $250,000 plus the deficit of $806,427.

"It is indeed gratifying to see such a manly expression from the carmen," said W. Kesley Schoepf, president of the traction company, in commenting on the action of the union men.

Street Railway Director Kuertz said that he had been working and will continue to work for a reduction in fares. "I am conducting an investigation and have found that wages are a large factor in the proposition," said Mr. Kuertz. "But there are many other considerations. For instance there was a considerable falling off in the number of car riders in April of this year compared with April of 1920. There also has been a reduction in the cost of material such as coal."

Service-at-Cost Grant Upheld

The validity of the Findlay service-at-cost ordinance has been upheld by Common Pleas Judge William F. Duncan at Findlay. The Toledo, Bowling Green & Southern Traction Company was granted the franchise by the Findlay Council last February.

Attorney George H. Phelps attacked the franchise in the court.

Judge Duncan held that the city had relinquished none of its rights under the new grant.

The City Street Railway Commission also issued a statement to the public informing riders that unless traffic increases in the next month fares would automatically jump from 8 to 9 cents.

The stabilizing fund which was originally set at $20,000 has now a balance of $17,486. The April deficit was $1,654. The ordinance became effective on March 17.

In April, 1921, there were 2,000 riders daily as compared with 2,900 in April last year.

Ten-minute service was put into effect with the new ordinance and it is possible that the commission may cut service to twelve minutes if the traffic slump continues.

City Construction with Private Operation Suggested

John W. Shartell, owner of the railways in Oklahoma City and Tulsa, Okla., told the City Club at Tulsa that the only hope for improvement in service and needed extensions was in municipal ownership, as the company could not hope to build extensions or otherwise improve the service. It will cost $5,000,000, he said, to build the Tulsa street railway up to the needs of the traffic. He advocated an immediate bond issue of $1,000,000 for railway extensions to be built by the city, explaining that the lines so built could be leased to the traction company for operation.

Another Settlement Proposed

Banker Makes Concession Looking Toward Rehabilitation of Company at New Orleans

C. C. Chappele, representative of the junior security holders of New York, interested in the New Orleans Railway & Light Company, has been in New Orleans for several days in conference with Mayor McShane and the City Commissioners trying to work out a plan whereby the traction company may be refinanced and rehabilitated. He is accompanied by W. W. Harris, an expert on public utility matters. Mr. Chappele is for any plan that will stabilize the securities of the company and restore its credit.

Mr. Chappele has sought to stress three points which he regards as essential of achievement if the city's railway troubles are to be settled. The first of these is a fair valuation; the second, a fair return; and the third and last, reorganization on lines that will instill confidence and enlist the aid of capitalists who might be induced to advance the money necessary to rehabilitate the property.

He deprecated any settlement by the courts which might lead to delays even if it placed a higher valuation upon the property than had been fixed by the citizens' committee of forty. The valuation by this body was $44,700,000. Mr. Chappele believed that this valuation did not represent the true value of the property, but said he would be willing to accept that amount and would recommend it to his principals as the minimum.

It was his honest opinion, however, that the property was worth $50,000,000 and he felt confident that, if the matter were left to the courts for adjudication, the valuation would very likely be fixed at $60,000,000. His belief was based upon the decisions of the courts in similar cases in the recent past.

The several conferences held by Mr. Chappele with the Mayor and Commissioners disclosed the fact no proposition would be entertained which did not give promise of lower fares and reduced gas and electric light rates. Mr. Chappele promised to prepare a statement for the Commission Council which would show the effect of the drop in the cost of labor and material upon the operating expenses, since Commissioner of Finance Murphy declared he would not commit himself to the $44,700,000 valuation until shown that the fare and rates for gas and light would be affected by the fall in the price of labor and material.

It has since been disclosed that the

plan submitted to the Commission Council on May 20 by Mr. Chappele contemplates the formation of an entirely new company. The plan adheres to the valuation placed upon the property by the citizens' committee of forty which was acceptable to the Eastern bankers at an 8 per cent return. The bankers had signified their willingness to accept a 7 per cent return, but the Council at that time was unwilling to consent to either that return or the valuation.

Mr. Chappele declared in his statement to the Council that nothing less than an 8 per cent return will be feasible to work out the tangle in which the company now finds itself and is of opinion that the courts, if left to adjudicate the matter, would give a higher rate of interest than was fixed by the committee of forty.

This plan, Mr. Chappele indicated in his report to the Council, would attract the capital desired to rehabilitate the company and would make ultimately for lower fares. The Commission Council decided to postpone consideration of the matter until May 23.

The city of New Orleans has been afforded an opportunity of carrying up its case against Receiver O'Keefe, who enjoined the Commission Council from interfering with the collection of the 8-cent car fare. Judge Clayton, who issued the injunction, has granted the city an appeal from the order. The case will now go to the United States Circuit Court of Appeals.

Injunction Denied to City

Justice McAvoy in the Supreme Court has denied the application of the city of New York for an injunction restraining the new Public Service Commission from taking office. The court's decision upholds the State law under which the Governor appointed the transit board, and permits the new members to take possession of their offices, which had been denied them by the old board.

The injunction, brought by Corporation Counsel John P. O'Brien in behalf of the city, sought to prevent the Governor's appointees, headed by Commissioner George McAneny, from taking charge of public service affairs.

Justice McAvoy, in the course of his decision, said:

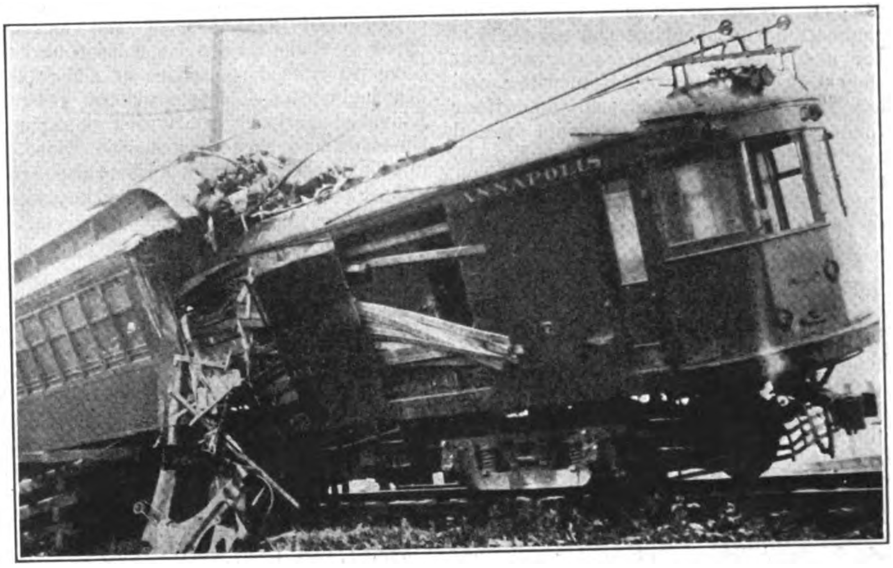
> The complaint grounds its demands for the inhibition of the injunctive process upon an allegation that the Transit Commission, these defendants, are about to and will grant under the pretended consents in the form of contracts which they will make for and in the name of the plaintiff with various street railroad companies and said contracts will purport to relieve the companies from the obligation of compliance with the provisions and conditions and obligations theretofore imposed, and that these defendants will modify and alter provisions and conditions of the contract and restore and validate rights of operation which the local authority, for instance now the Board of Estimate and Apportionment, has forfeited, and that such acts will result in irreparable financial injury to the plaintiff, its people and inhabitants unless thwarted by judicial order. . . . The imminence of danger of the execution of contracts that will violate the city's prescribed constitutional rights cannot be before the court for even an examination of the legality thereof until they are proposed to be executed.

Twenty-three Hurt on Washington Interurban

A head-on collision between a passenger train and a work extra on the Washington, Baltimore & Annapolis Electric Railroad at Ferndale, Md., on May 5, resulted in the death of one employee and the injury of ten passengers and thirteen employees. After investigation of this accident, the chief of the Bureau of Safety of the Interstate Commerce Commission reports the following conclusions:

> This accident was caused by work extra No. 7 being operated against train No. 339, an overdue superior train, without proper authority, for which Conductor Johnson and Motorman Dyson are responsible.
>
> The statement of Conductor Johnson indicates that in some manner he and Motorman Dyson reached the conclusion that inasmuch as the train leaving Baltimore at 2:20 p.m. had passed, the next southbound train they would have to meet would be the train leaving Baltimore at 3:20 p.m., both of them overlooking train No. 339, which was scheduled to leave Baltimore at 2:50 p.m. This accident could have been avoided had either of these employees consulted the time table before proceeding northward from Marley, for they would have seen that the train scheduled to leave Baltimore at 2:50 p.m. was operated daily.

At the time of the accident the crew of train No. 339 had been on duty a little more than ten hours, after about 11½ hours off duty. The crew of work extra No. 7 had been on duty about 8½ hours, previous to which the members had been off duty twenty-one hours or more.



TWO TRAINS OF THE WASHINGTON, BALTIMORE & ANNAPOLIS LINE COLLIDED AT FERNDALE ON MAY 5

The line on which the accident occurred, at present extending between Short Line Junction and Annapolis, was taken over by the Washington, Baltimore & Annapolis Electric Railroad on March 16, 1921, and a contract was made six days previous thereto for the installation of an automatic block signal system between the two points. The opinion of the commission is that had such a system been in use at the time of the accident, the collision undoubtedly would have been prevented.

Conductor Johnson was employed as a brakeman in 1918, promoted to extra motorman and extra conductor in January, 1919, and to freight conductor in April, 1919. On Sept. 20, 1919, he failed to observe an order and ran by a meeting point. Motorman Dyson was transferred from the shop department to the transportation department in March, 1914, and assigned to service as an extra motorman and inspector. His record is clear.

$1,000,000 for Storage Yard at Boston

The Boston (Mass.) Elevated Railway is constructing an elevated train storage yard at Forest Hills, the southern terminus of the main trunk line elevated road. The present stub-end double-track line, which ends about a train length beyond the Forest Hills Terminal Station, is being extended across the junction of Washington and Walk Hill streets, onto private land purchased by the company. Here the structure will branch out into one four track section and one three track section.

Only the three track section will be built at the present time, but the leads are being installed for the four track section. On this latter, it is planned also in the future to construct a 500-ft. house, for an inspection shop and minor emergency repairs.

The immediate work on hand contemplates the completion of three storage tracks with a total capacity of eighty standard elevated cars. The estimated cost is $660,000, for the immediate work, and about $1,100,000 for the entire job, including the house. The latter will be of brick and concrete construction, on a steel framework. The ground floor below the structure will serve as a basement for the storage of supplies, and will be connected with the surface car tracks.

Capital for this improvement is coming from the money made available by the State purchase of the Cambridge subway, and the expenditure has been approved by the Massachusetts Department of Public Utilities.

Employees Approve 15 per Cent Wage Reduction

Employees of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., at a recent meeting voted on the compromise proposition of a 15 per cent wage reduction offered by the company and the vote was carried by a substantial majority. The men had previously rejected two proposed wage reductions. In accordance with its contract, the company notified the men that on May 1 the agreement was to be opened up. A proposition was then made to reduce the wages of all employees 20 per cent, all rules and working conditions to remain the same.

After the men had flatly rejected this proposition the company made a compromise proposition, offering a wage cut of 15 per cent. This was also rejected. The company then notified its employees that it was willing to put the matter up to arbitration and that the original plan of 20 per cent reduction would go into effect on May 1, subject to award by the arbitration board retroactive to May 1. Soon after this decision the committee representing the men asked for a further conference, stating that they would call a special meeting and ask the employees to reconsider their former action. It was at this special meeting that the proposition of a 15 per cent reduction carried.

Order Attacked Directing Terminal Improvement

The Pacific Electric Railway, Southern Pacific Lines and Los Angeles & Salt Lake Railroad have asked for rehearings with the Railroad Commission on its recent passenger terminal order, declaring that the tendency of the order is confiscatory, that it was apparently prepared in a hasty manner, that it intermingles and confuses their separate interests, and calls upon them to participate in a colossal improvement which, they insist, only Congress can bring about.

In case the application for a rehearing is denied by the commission the railroads state that they are prepared to ask the State Supreme Court for a writ of review. If the State Supreme Court should uphold the order of the commission, the next step will be to ask the United States Supreme Court for a writ of error. It is stated that it is not unlikely that some of the railroads will ask for a Federal injunction against the commission's order.

The Pacific Electric Railway objects to the order, its officials say, because it requires the company to participate in the construction of a union passenger terminal, and it looks with disfavor upon the commission's requirement to the effect that it pay for a separation of grade crossings at the Macey Street and Seventh Street crossings, declaring that it has no property there and that other roads should bear the expense.

The attack of the Southern Pacific upon the commission's order declares such authority lies only with the Interstate Commerce Commission. The Pacific Electric petition is based upon jurisdictional and constitutional grounds, challenging the authority of the Railroad Commission to order payment by the railway for work in which it has no interest and where it will not be required or permitted to use the new facilities.

The order of the commission directing the expenditure of $32,000,000 in terminal improvements at Los Angeles was reviewed in the ELECTRIC RAILWAY JOURNAL for May 7, page 868.

Legislative Inquiry Completed

Massachusetts Railways Absolved — Evidence to Go Before District Attorney

The special committee of both houses of the Massachusetts Legislature which has been investigating alleged irregularities in connection with the passage of street railway relief bills in 1918 and 1919 has filed its report. In all, thirty-eight members of the legislatures of those two years were found to have purchased securities of either the Massachusetts Electric or the Boston Elevated Railway companies at various times during those years. Of these, a number opposed and voted against the bills, but apparently felt sure they were certain to pass.

The two companies were entirely absolved from the insinuations that were made before and during the hearings that they had led the members of the legislature to speculate in the stocks of the companies with a view to influencing their votes, or that the companies or anyone representing them, had used any improper influence to secure favorable action on the bills. Allegations were dismissed that there was a "slush fund" raised and used for purposes of corrupting legislators.

The committee consisted of two senators and three representatives, none of whom was a member of the 1918 Legislature, although one was a member of the following year's body, it being determined to include that year's transactions in the investigation, after the committee had been appointed. Four of the committee were Republicans and one a Democrat. The report was unanimous as far as the main findings were concerned and was signed by all members of the committee, but the Democratic member filed a minority report dissenting from some of the conclusions.

The report recommended that copies of the evidence brought out in the hearings be transmitted to the District Attorney of Suffolk County, for such action on his part as he feels advisable. There was no censure offered for those members who had speculated in the railway stocks, nor was there any recommendation for the expulsion of those still serving in the Legislature, as had been expected. The committee took the ground that being a joint committee it had no right to recommend to either house what action each should take with its own members who were involved. It is expected that each branch of the Legislature will take up this matter on its own account.

Claims were refuted that the bill authorizing the purchase of the Cambridge Subway by the State from the Boston Elevated was a "steal," and that the $7,868,000 paid for it went into the pockets of "State Street financiers." The evidence showed that the money paid by the State is being legitimately devoted to capital improvements by the trustees of the Elevated, under the control of the Public Utilities Board. As the expressed and understood purpose of the purchase was to provide capital for the trustees to use for necessary improvements, no criticism is attached to anyone on this score. It was shown that the rental being paid to the State by the company for the use of the subway, not only pays the interest on the State's investment, but also provides a sinking fund, which will ultimately retire the whole indebtedness, and leave the commonwealth the owner of the subway without cost to itself.

The committee recommended that the Legislature adopt a joint rule which will clearly define the rights and duties and members hereafter, with regard to purchase or ownership of stock in corporations, when legislation affecting them must be voted on.

Ten-Cent Cut in Toledo

Union Insists on Arbitration Although Matter Would Appear to Be Self-Adjusting

After more than a month of parley in which time the employees of the Community Traction Company at Toledo, Ohio, turned down one offer of a wage cut of 2 cents an hour from their maximum of 60 cents, company officials put into effect a reduction of 10 cents making the scales 45, 47 and 50 cents beginning May 23. The union submitted to the cut only on consideration that the disputed wage question shall be arbitrated according to the terms of the Milner service-at-cost ordinance.

Frank R. Coates, president of the railway, declared that he saw no need of arbitration, under the terms of the ordinance, which provides that all salaries and wages shall be based on rates prevailing in other cities. He put the matter before the board of control for final action as to whether or not arbitration should be resorted to.

Edward McMorrow, member of the executive board of the "Amalgamated," who has been spokesman for the union men, said:

> The union will accept as a maximum wage any award of the board of arbitration over the offer of 50 cents an hour.

This proposition is regarded as so ambiguous that it is doubtful if the board of control will go to the mat on such a question. If the board should agree to open up the whole question of wages company officials believe that they will be able to secure a larger cut than is made in the proposed scale.

The cut in wages is only 18 per cent as compared with cuts of 20 per cent in Cleveland and Detroit, the rates in which cities have always governed Toledo wages on a differential basis.

Many of the working conditions forced into agreements during the war period are also omitted from the proposed agreement at Toledo. Two weeks' vacation with pay is also cancelled and special provisions for overtime rates and runs are also changed.

The board of control and Street Railway Commissioner W. E. Cann have taken no part in wage negotiations up to this time and it is possible that they may decline to step into the controversy unless the interest of the public is at stake.

By dating of the wage contract from May 21 rather than April 1, the Toledo negotiations now follow those of Cleveland and Detroit.

The 1920 wage rate was 54, 56 and 60 cents. The new scale is 45, 47, and 50 cents an hour. Common labor rate in Toledo is now 35 to 45 cents an hour.

Wage Reduction Accepted Gracefully

Foregoing their contract with the company in order to accept a reduction in wages, motormen and conducters of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., have accepted a voluntary reduction in wages of 5 cents an hour, retroactive to May 1. The pay will now be 66 cents an hour. The men's old contract had some time to run.

About a year ago, when the wage was 54 cents an hour, the company set aside its contract with the men in order to increase their wages to 71 cents an hour. The interurban line is headed by David J. McCahill, and the employees said they took the cut in appreciation of the treatment accorded them by the company and its president.

On the men's initiative the reduction was made retroactive to May 1, although President McCahill said he would be satisfied to have it begin May 16. They also offered to take a greater reduction if it should prove necessary. Approximately 450 men are affected.

The employees of this road operate under a plan which provides for their participation in the profits of the company different from most other plans of the kind. This plan was described at length in the ELECTRIC RAILWAY JOURNAL for March 27, 1920, page 664.

Approves of One-Man Cars.—The Rhode Island Company, Providence, R. I., has received authorization from the Public Utilities Commission to operate one-man cars in Woonsocket and Pawtucket. The petition was made after President Wood, of certain Bay State lines, notified the Rhode Island Company that one-man cars would be run over their lines into the cities of Woonsocket and Pawtucket.

New Home for Railway

Company at Los Angeles Will Soon Occupy Top Five Floors of New Structure

Up-to-date architectural and engineering features are embodied in the new building of the Los Angeles (Cal.) Railway at Eleventh Street and Broadway, into which the company is now moving. The structure is of class "A" reinforced concrete construction.

The building is 176 ft. long and ten stories high. It has the greatest area of frontage on Broadway of any building in the city. It is of "flatiron" type, measuring 65 ft. on the south end, which fronts on Eleventh Street, and 30 ft. on the north end. The center of this north end is on the center line of Broadway extending from the tunnel at Temple Street to Tenth Street and affords an impressive view down the main artery of Los Angeles.

LOS ANGELES RAILWAY'S NEW HOME

A granite base supports the two lower stories of terra cotta and the six-story shaft of brick exterior extending to the ninth floor. The two top stories have a terra cotta finish with colored decorative pilasters and figureheads at the four corners of the building. The main supporting columns of the building are 28 in. and 30 in. square.

The main floor will be devoted to stores. The second to fifth floors will have general offices and the Los Angeles Railway will use the top five floors. Several features particularly adaptable for the railway are included in the architecture.

There will be no assembly room for lectures, with blackboards, maps and other equipment to be used by the instruction department.

The railway's library for employees will be on the sixth floor. The medical department will be equipped for using an X-ray machine and other modern electrical equipment of the profession. A specially constructed sound-proof room will be used by the auditing department for the punching and sorting machines.

Occupancy of the new building will centralize the offices of the railway, as the instruction department is at present located at Sixth Street and Central Avenue. This will leave only the five carhouses, the shops and electrical construction and repair department outside the main offices. Noerenberg & Johnson are the architects.

$200,000 for Improvements

Federal Judge English, sitting in East St. Louis, Ill., has approved an appropriation of $200,000 for the betterment and replacement of property of the Alton, Granite & St. Louis Traction Company, after a personal inspection of the company's property made with W. H. Sawyer, Fred Allen and C. B. Thomas, receivers for the company. Of the appropriation $80,000 will be used for repair work and the purchase of one-man cars for use in the city of Alton. A new bridge, costing $15,000, will be built at Woodriver, Ill. Judge English recently made permanent the temporary receivership under which the company has been operating.

Disorder Rife in Albany

After perhaps the worst outburst of rioting and violence since the beginning of the strike waged by the employees of the United Traction Company, Albany, N. Y., quiet and order again prevailed on May 23 with the state troopers and the city mounted police patrolling the business zones. Both day and night service has been resumed by the railway.

The riots on May 19 and 20 followed a recent campaign to oust the jitneys from the streets. This campaign instituted by police authority proved unpopular and as a result the cars were battered with flying rocks and stones and the non-union crews had to desert their posts for safety. Though police reserves were immediately summoned and troopers from Troy were rushed to the scene, several persons were injured and many cars were wrecked before order was restored.

Frankford Lease Probably Best

Director Twining of the Department of City Transit, Philadelphia, Pa., at a recent hearing submitted to twenty-eight questions put by E. E. Ziegler, president of the North Philadelphia Business Men's Association, on the proposed temporary lease of the Frankford elevated and Bustleton surface lines to the Philadelphia Rapid Transit Company. The director declared that the lease as now drafted would not hold up the operation of the Woodland Avenue line and the Chestnut Street subway. He said further that the lease was in fact only a compromise, but that it was the best that could be arranged. Mr. Twining emphasized the fact that the lease under consideration would be rewritten after the Public Service Commission had determined on the Philadelphphia Rapid Transit valuation.

Additional Transit Acts Approved

Governor Miller of New York on May 6 signed two bills relating to New York City transportation matters. One was the Burling measure, which authorizes the creation by the Westchester County Board of Supervisors of a commission of seven members to arrange for improved transportation service by railroad or electric railways between New York City and points within Westchester County.

The other bill is the Walker measure which amends the rapid transit act with reference to payment for work done. This measure is aimed to meet conditions which may arise as a result of the eventual adoption of the unified system which is to be created by the new transit commission. It provides that where the Rapid Transit Commission shall have failed to certify a voucher for the payment of money a proper or sufficient voucher shall not be a condition precedent to the liability of the city.

$1,643,000 to Be Spent in Portland

The Portland Railway, Light & Power Company, Portland, Ore., announces that reconstruction work, improvement, extension and maintenance either now under way or already authorized and ready to be undertaken in the near future will entail expenditures of between $1,500,000 and $2,000,000. The following projects are included in the exhaustive plan for 1921:

New steam turbine of 12,500 kilowatt rated capacity installed in Station "L," work now under way	$400,000
Replacement of 50,000 ties on lines of the interurban system, now under way	75,000
Bridges and buildings and maintenance work on the interurban system, now under way	150,000
Maintenance of way work on the Portland city car lines, now under way	350,000
Reconstruction and repaving of car tracks on First Street, from Alder to Madison	36,000
Reconstruction and repaving of Third Street from Washington to Glisan, authorized	52,000
Reconstruction and repaving of East Twelfth Street from Hawthorne Avenue to Milwaukee Avenue, contract let	36,000
Reconstruction and repaving of Woodward Avenue from Grand Avenue to East Tenth Street, now under way	20,000
Reconstruction and repaving of Vista Avenue from Spring Street to Patton Road, just completed	14,000
Repaving on Main Street, Oregon City, under way	5,000
Rebuilding trestle on Oregon City line, under way	4,000
Repairing and repainting over 50 stations and waiting-rooms on the various interurban lines, now under way	5,000
Reconstruction and repaving of Killingsworth Avenue from Interstate Avenue to Greeley Street in prospect	57,000
Reconstruction and repaving of Ravensview Drive from Greenway Drive to Elizabeth Street, in prospect	20,000
Reconstruction and repaving of East Lincoln Street from East 54th to East 57th Street, in prospect	16,000
Reconstruction and repaving of Twenty-seventh Street from Thurman to Upshur Street, contract let	3,000
Other work	400,000
Total	$1,643,000

News Notes

Franchise Negotiations Renewal.—The conferences have been renewed looking toward the drafting of a new franchise for the Grand Rapids (Mich.) Railway. At a recent session General Manager De Lamarter is said to have been inclined to the insertion in the franchise of a four-tickets-for-a-quarter proviso with a charge of 10 cents for transients, until the company has made good its accumulated losses from operation.

May Establish Car Service. — The Interstate Electric Corporation, which owns the San Angelo (Tex.) Water, Light & Power Company, plans soon to establish railway service in that city. This report is given credence by the placing of an order by the San Angelo Water, Light & Power Company for a 500-hp. oil-burning engine and electric generator. The new equipment will double the capacity of the San Angelo plant.

Minneapolis Veterans Organize.—The Veterans Club has been organized by old-time employees of the Twin City Rapid Transit Company, Minneapolis, Minn. One hundred and thirty-four men who had been more than twenty-five years in service were present at the first meeting. Nels J. Nelson, claim adjuster, was made chairman and F. A. Anderson, social service director, was temporary secretary. A committee was appointed to draw up the constitution and its members will be directors for the first year.

Investors Will Be Protected. — Each employee of the Beaver Valley Traction Company, New Brighton, Pa., and the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa., recently received a notice from General Manager Boyce reminding the employee of the "Pull Together" motto of the company which makes each employee a booster of his company, fellow workers and management officials. Every man is urged to defend the company in a courteous manner and to secure the names of people who make erroneous statements about the company, and the management will be glad to send a letter or have an interview with such complainants to inform them of the truth. The manager announces that for the first three months of this year the Pittsburgh & Beaver Street Railway and the Beaver Valley Traction Company had a combined loss of $6,845.

Funds Needed for Transit Facilities.—E. W. Edwards, president of the Rapid Transit Commission, Cincinnati, Ohio, at a recent meeting before the business men of the city declared that a bond issue of $3,000,000 in addition to the amount paid by the abutting property owners would probably go before the public at the August primary election for the purpose of boulevarding the canal. He discussed the outlay of funds of the commission and just what accomplishments were expected. He said that the operation of the loop by the Cincinnati Traction Company would mean many years of court action and that the commission had decided to go ahead with the work on the canal and leave the question of operating until such time as the traction company had reduced fares to a lower limit. Speaking on the cost of the rapid transit system, Mr. Edwards said the commission had spent $542,000 for property, and that contracts had been let for the first four sections totaling $2,079,000. Of these contracts, there had been $977,000 worth of work already completed. This had left the commission a balance of approximately $3,500,000 with which to push the completion of the loop.

Programs of Meetings

American Institute of Electrical Engineers

The American Institute of Electrical Engineers will hold the thirty-seventh annual and Pacific coast convention at Salt Lake City, Utah, on June 21-24. A tentative program has been arranged, including an address of welcome by Charles R. Mabey, Governor of Utah, and an address by President Berresford. The entertainment program will consist of sight-seeing trips to Great Salt Lake and Salt Lake Valley, where members can inspect a mining canyon. An opportunity will also be afforded the members to see the largest outdoor substation in the world, the property of the Utah Power & Light Company. Various technical papers will be read on each of the convention days.

New York Electric Railway Association

The thirty-ninth annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, N. Y., on June 11. The meeting will convene on the arrival of the delegates who come by the morning train. Reservations so far received far and away exceed the number enrolled for previous years' meetings of the association so long in advance of the date of the meeting. Various subjects will be discussed, special attention being given to the questions of one-man car operation and taxation in its different phases.

The entertainment features for the men will not be started until the conclusion of the business sessions. The ladies will have bridge parties and will enjoy golfing, boating and other outdoor sports such as the territory around Lake George affords.

Requests for hotel accommodations should be made as early as possible to Charles A. Douglass, manager, Fort William Henry Hotel.

Financial and Corporate

$1,000,000 Lost by Seattle

City Running Steadily Behind in Its Operation of the Seattle Municipal Railway

According to the 1920 annual report of Seattle's superintendent of public utilities, the operating revenue of the Municipal Street Railway showed a gain of 31.4 per cent over the previous year. This increase was due principally to the fact that the 5-cent fare was changed on July 24, 1920, to a 7-cent cash fare with four tickets for a quarter or two cash fares for 15 cents.

Notwithstanding this increase in revenue it was impossible to keep the expenses of operation to less than 102.2 per cent, with the result that the net loss for the year was nearly $1,000,000. If the previous deficit in the profit and loss account is added the total deficit since the city took over the operation amounts to $1,236,284. The accompanying tables speak for themselves and show the detail of operation for the past two years.

In referring to the jitney situation the report recommends that some action be taken whereby the system may be regulated and the operators compelled to live up to such regulation.

WOULD BAR JITNEYS

Jitneys, the report says, should not be allowed to operate on the same street on which car lines are located, as there is a sufficient amount of equipment in the railway department to take care of all travel on any line operated without the assistance of jitneys. There are, however, a few outlying districts which at this time are not served by the Municipal Railway, and in such locations the jitneys could legitimately operate, provided they are compelled to pay a certain percentage of their earnings to the city for the right to operate over the streets, as they are operating simply for the purpose of making money and are not in the same class as a privately owned machine.

Substantial decrease in the number of accidents on the car lines during 1920 as compared with the previous year is shown by the report. The total number of accidents in 1920 was 6,511, as against 7,291 in 1919. The number of collisions with cars, 246; collisions with vehicles, 2,976; collisions with pedestrians, 205; injuries on cars, 317; step accidents, standing cars, 403; derailments, 231, and miscellaneous, 680. There were 106 ejectments of passengers for which damage claims were filed and six fatalities among passengers and trainmen against nine in 1919.

The traffic handled during the year was 122,866,577 passengers as against 133,176,297 the previous year. Revenue passengers decreased 9,114,648, while free passengers increased 363,297 and transfer passengers decreased 1,558,369. To handle this traffic 15,829,054 car-miles in 1,765,635 hours were operated as against 16,162,539 miles in 1,771,138 hours the year before. The average speed of cable cars for the year was 6.47, for electric cars 9.17 and the average for all services 8.97 miles per hour.

INCOME AND PROFIT AND LOSS STATEMENT—SEATTLE MUNICIPAL RAILWAY

	1920	Per Cent of Total Operating Revenue	Per Cent Change Over Previous Year	1919	Per Cent Total Operating Revenue
Operating revenue:					
Passenger	$5,283,658	96.72	31.1	$4,030,602	96.94
Firemen and police	54,000	0.99	42.1	38,000	0.91
Special cars	1,698	0.03	260.0	471	0.01
Mail service—postal employees	9,388	0.17	51.0	6,213	0.15
Express revenue—newspapers, etc	8,770	0.16	122.0	3,948	0.09
Freight	39,977	0.73	24.6	32,112	0.77
Miscellaneous transportation	1,055	0.02	*67.5*	3,264	0.89
Auto bus revenue	12,218	0.22	4349.0	275	0.01
Total from transportation	$5,410,764	99.04	31.5	$4,114,885	98.96
Non-operating revenue:					
Station and car privileges	17,158	0.300	32.6	12,947	0.31
Rent of equipment	105	0.002	*96.9*	3,523	0.09
Rent of track and facilities	24,089	0.400	15.1	20,938	0.50
Rent of real estate	96	0.002	*98.0*	4,638	0.11
Power sold	465	0.008	*19.7*	579	0.01
Miscellaneous revenue	723	0.010	12.5	643	0.02
Lost and found department	1,680	0.030	....	......	.....
Miscellaneous rent revenue	8,312	0.150	....	......	.....
Total	$52,628	0.96	2.2	$43,268	1.04
Total operating revenue	$5,463,392	100.00	31.4	$4,158,153	100.00
Operating expenses:					
Way and structures	$457,105	8.18	61.8	$282,993	6.93
Equipment	734,017	13.16	38.9	528,507	13.00
Power	683,934	12.24	22.5	558,528	13.70
Conducting transportation	2,644,291	47.45	35.5	1,950,460	48.00
Traffic	3,273	0.05	47.0	2,228	0.05
General and miscellaneous	362,547	6.49	48.0	245,109	6.01
Auto bus expense	22,956	0.41	2437.0	904	0.07
Depreciation	677,179	12.12	35.7	499,173	12.29
Total	$5,585,302	100.00	3.73	$4,067,903	100.00
Gross income	*121,910*	.....	*235.5*	90,250	.....
Deduction:—					
Interest on general bonds	35,750	.....	53.5	23,281	.....
Interest on revenue bonds	823,000	.....	42.0	579,684	.....
Discount on funded debt	6,908	.....	199.0	2,314	.....
Interest on warrants due	2	.....	*99.9*	2,145	.....
Total	865,660	.....	42.5	$607,424	.....
Net income to P & L	*987,570*	.....	*91.0*	*517,174*	.....

$2,000,000 of Stock to Monongahela Patrons

George M. Alexander, president of the Monongahela Power & Railway Company, Fairmont, W. Va., has announced that $2,000,000 of preferred stock of the company will be offered to patrons for subscription. The company is the successor to the Monongahela Valley Traction Company, the change in name having been made so as to reflect more accurately the operations of the company.

The preferred capital stock of the company has recently been increased from $4,000,000 to $8,000,000. Of the increase approximately $2,000,000 has been made available for purchase by the patrons of the company in the communities served by it.

In announcing the change in plan Mr. Alexander said in part:

> The company in adopting this policy, making it possible for its customers to acquire its stock, feels that the patrons of its railway lines, the users of its power, electric light and gas are entitled to participate in the profits arising from such service for the following reasons:
>
> 1. So that the company and the public it serves shall be partners in fact in order that the service rendered shall respond to the demands of the public.
> 2. So that the actual ownership of the property shall be vested in the people upon whom the company depends for patronage.
> 3. So that the profits (or wages paid for the use of capital) of the company shall be returned to the people who make these profits possible by their patronage.
> 4. So that the company and the public may work in closer co-operation for the benefit of the territory served.
> 5. So that the money obtained from the sale of securities will be used where obtained and will go for purposes that will benefit the entire community.
> 6. So that the people of these communities may have a sound home investment for their capital and savings.

The par value of this stock is $25 per share and the patrons may purchase this stock at $19 per share. The stock pays dividends at the rate of 6 per cent annually on the par value, which makes the return at the above price nearly 8 per cent per annum. The stock may be purchased for cash or on a satisfactory partial payment plan.

Time Extended for Filing Inventory

The Indiana Public Service Commission has extended until June 15 the time in which the Indiana Railways & Light Company must file an inventory with the commission. Last January the commission ordered an inventory filed by March 15, and at the end of that time an extension until April 15 was granted. The company failed to report then and another extension was granted setting the date as May 15. The commission announced recently that it would instruct the engineering department to investigate the company's property and set the final date for filing the inventory as June 15.

Deficit Still in Toledo

Pay-Leave Fare Collection Proposed During Rush Hours—Commissioner Building for Permanency

Operations of the Community Traction Company, Toledo, Ohio, for the month of April showed a deficit of $72,730 after payment of all charges and fund accruals. The total decrease in gross revenue for the month was $14,229.

Earnings from operation for the month totaled 41.17 cents per car mile. Expenses of operation took 39.3 cents. The balance plus miscellaneous income gives 4.08 cents per car mile to meet taxes, reserves and fixed charges. The total passenger riders per car mile amounted to 8.14 exclusive of employees carried.

The operating ratio was reduced to 90.60 in April from 92.21 in February and 93.25 in March. With the elimination of the Huron Street line it is anticipated that this ratio will be less than 90. The maintenance and repair fund allowance is being arbitrarily maintained at 10 cents a car mile for the summer months.

Street Railway Commissioner McCann has outlined some of his plans for increasing economy. He is conducting operations on a strict business basis and is trying to do justice to the property itself rather than attempting to make a showing during the first few months of operation under the new service-at-cost plan.

During rush hours the pay-leave system of fare collection is to be used on the cars to speed up downtown loading. By having the cars pay-enter inbound the collection of fares would be eliminated in the congested district.

Safety rules may also be changed to allow loading of more than one car at a time at some of the downtown corners. A plan of complete downtown rerouting so as to separate railway and vehicular traffic is also being developed.

The new rate of 40 cents a car mile for interurban rental has become effective and the commissioner believes he can persuade the interurban companies to build a stretch of track on Jackson Avenue between Huron and Superior Streets to make a new loop for Detroit-Cleveland cars and several other lines now using a long loop through the congested district. It is estimated that the mileage saved at 40 cents per car mile under the new arrangement would save to the interurbans the cost of the track in less than a year. This plan if carried out would make Toledo's new interurban station approachable from both sides and greatly facilitate the speed of loading and dispatching cars.

Stock Dividend at Detroit

In connection with the stock dividend of 2½ per cent declared on the $15,000,000 of capital stock of the Detroit United (Mich.) Railway, it has been explained that in view of the abnormal business conditions prevailing the board of directors, notwithstanding the existence of a surplus of many million dollars represented in the value of its properties, deemed it prudent to proceed with extreme caution and to conserve the company's resources in every possible way and therefore decided to declare a stock dividend at 2½ per cent payable on June 1, 1921, in lieu of the usual cash dividend payable at that date.

$179,000 Loss in Buffalo

The International Railway, Buffalo, N. Y., shows a deficit for the three months' period ended March 31, 1921, of $179,924 against $77,822 for the corresponding period of 1920. Operation in 1921 so far presents none too bright a situation. For the two months ended Feb. 28 the company failed by $300,000 to earn the amount required and at the end of March, as is noted in the accompanying table, the gross revenues are insufficient by $466,576 to meet operating expenses, taxes, depreciation, etc. Mr. Tulley, president of the railway, in a recent statement announcing a wage cut for unskilled employees effective May 1, spoke of the financial distress of the company. He stressed the industrial depression which had been so acute that a falling off of 17 per cent was noted in the company's gross receipts.

STATEMENT OF EARNINGS OF INTERNATIONAL RAILWAY

Three months ended March 31:	1920	1921	Per Cent Change
Operating revenue	$2,418,022	$2,685,550	10.6
Operation and taxes	2,092,841	2,497,489	19.3
Operating income	$325,181	$188,061	*42.4*
Non operating income	5,092	7,863	54.4
Gross income	$330,273	$195,924	*40.7*
Income deductions	408,095	375,848	*7.9*
Deficit	*$77,822*	*$179,924*	*131.1*
The formula for the determination of a fair return upon the value of the property, adopted by the Public Service Commission when granting the 7c. cash fare—4 tickets for 25c., for the City of Buffalo, represents an annual sum of approximately $2,650,000. Proportion for three months	....	$662,500	....
Gross income for three months ended March 31, 1921	....	195,924	....
Amount by which gross revenues are insufficient to provide for operating expenses, depreciation and renewals, taxes, and this return upon the value of the property devoted to the public service	....	$466,576	....
The formula for depreciation and renewal adopted by the Public Service Commission when granting the 7c. cash fare—4 ticket for 25c., for the City of Buffalo, represents an annual charge of $1,016,000, and effective July 1, 1920, the monthly appropriation from earnings has been in accordance therewith.			
Comparative charge for depreciation and renewals for the first three months of 1921 and 1920, as included in "Operation and Taxes".	$99,998	$254,000	154.5

Massachusetts Roads Exempted From Excise Tax

An additional exemption of two years, 1922-23, from the assessment of the so-called commutation or excise tax in Massachusetts has been granted the street railway companies of that state by a bill just passed by the Legislature and signed by the Governor. During the severe financial crisis which confronted the companies two years ago they were relieved from the operation of this tax for the years 1920-21 by legislative enactment, and the present bill is in the nature of a further extension.

There was considerable opposition to the passage of the present extension, and the original bill was defeated. The speaker of the lower branch of the Legislature, B. Loring Young, who is exceptionally well acquainted with street railway financial conditions, himself took the floor on a motion for reconsideration, and so impressed the members with the necessity for continued relief from this tax that the measure was reconsidered and passed.

This tax is levied as a percentage of gross receipts, the maximum being 3 per cent, for the use of the various towns in which the street railway tracks are laid, to pay for maintenance of public ways and bridges. The tax is apportioned among the towns in the ratio of the mileage of track in each one.

Brief Filed in Suit for Restoration

Edward C. Turner, former attorney general of Ohio and now counsel for the Columbus Railway, Power & Light Company, Columbus, Ohio, has filed a brief of 128 printed pages in the suit of the company against E. W. Clark & Company, Philadelphia, Pa., former operating managers of the railway, to recover $2,737,621 or $2,655,040 depending upon which of two sets of claims is considered. The brief represents the summation of the controversy that has been in progress almost three years before Common Pleas Judge E. B. Kinkead and Master Commissioner George B. Okey, Columbus.

Mr. Turner charges that the Clarks underwrote and others invested. According to him "Columbus and the surrounding territory are full of suckers." He charges that for a quarter of a century the Clark interests exercised a control at Columbus through the proxy committee—"the very weapon by which they were finally unhorsed." According to Mr. Turner the management of the company was finally taken away from the Clark interests by Charles L. Kurtz, the present president of the Columbus Railway, Power & Light Company, and by D. Meade Massie, Chillicothe, Ohio.

The brief is considered one of the most remarkable documents ever submitted in a suit brought in Franklin County, particularly in a civil suit. It is replete with the reiteration of charges of mismanagement on the part of the former operators. Mr. Turner says that "throughout a busy career covering the trial of many cases where brains were combined to circumvent justice, I have never encountered an abler witness or one who could play a better game of mental chess on the witness stand than Mr. Clark. But truth is mighty and will prevail."

Counsel for E. W. Clark & Company have not yet filed their brief in reply.

Miami Traction Has Quit for Good

The Miami Traction Company, which ceased operating the electric railway in Miami, Fla., following the fire that destroyed its plant, carhouse and some equipment more than a year ago, will "never operate another car in Miami," S. M. Tatum, treasurer of the company, told the Civic Voters League at a meeting which he was invited to address. Mr. Tatum discussed the traffic situation from the standpoint of the company. He did not touch on the latest development—the suggestion that the Carl G. Fisher interests owning the Miami Beach Electric Company take over the franchise and track of the Miami concern.

Mr. Tatum described how the City Council had failed again and again to provide protection for the company from the inroads into the transportation business made by the jitneys, and how at last the Council had refused to call an election on the question of buying the car line although petitioned to do so by the Chamber of Commerce, the Rotary Club, the Real Estate Board and several hundred citizens. It even refused to accept the report favorable to municipal ownership brought in by a committee of citizens appointed under the Council's own direction to investigate the traction situation and make recommendations for a resolution.

The speaker ventured the opinion that no company could be induced to come in and take over the railway franchise unless the jitneys were legislated off the streets. The franchise, he said, is very severe, anyway, and had been looked upon unfavorably by railway operators to whom it had been shown.

The last direct offer made by the company to the city was to sell the tracks to the city for $75,000, and the cancellation of debts owned by the company to the city. These debts total about $14,000.

Abandonment Ahead

The critical situation regarding the railway at Lafayette, Ind., took a new turn recently when it was announced that the Northern Indiana Gas & Electric Company has bought the railway's power plant at the foot of South Street and had taken an option on the car lines, effective until June 10.

Clarence H. Geist, president of the Northern Indiana Company, has conferred with George R. Durgan, Mayor, and the members of the Board of Public Works and told them that his company had persuaded the Terre Haute, Indianapolis & Eastern Traction Company to take over the railway lines and operate them as lessee providing the city will guarantee the company protection from the competition of jitney buses.

The alternative to the offer made the city by the Northern Indiana Gas & Electric Company and the Terre Haute, Indianapolis & Eastern Traction Company is complete abandonment of the railway. The Northern Indiana Company plans to dismantle the power plant and take over its business at the newly enlarged power station of the Northern Indiana Company. The plan is to have the railway buy power from the Northern Indiana Company.

Financial News Notes

Short Abandonment Approved.—The Board of Public Utility Commissioners of New Jersey has granted permission to the Millville Traction Company to abandon 0.8 of a mile of track and relinquish the franchise on South Second Street, Millville, at the end of the line.

Cannot Abandon Service.—The State Public Utility Commission recently refused permission to the Bridgeton & Millville Traction Company, Bridgeton, N. J., to cease operation on its line between Newport and Bivalve. Vigorous opposition was voiced to this abandonment by residents along the route.

Westford to Contribute to Railway.—The town of Westford, Mass., has secured authority from the Massachusetts Department of Public Utilities to contribute the sum of $1,829.23 toward the cost of operation and the fixed charges of the line of the Lowell & Fitchburg Street Railway within the limits of that township.

Successor Company Chartered.—The Abilene (Tex.) Traction Company has been chartered with a capital stock of $100,000 to take over the property of the old traction company which failed and which has not been operated for two years or more. The incorporators of the new company are J. N. Burjac, Price Campbell and G. W. Fay.

Sale Under Foreclosure Restrained.—The sale of the property of the Standard Traction Company, Dallas, Tex., under foreclosure proceedings to satisfy a judgment for $5,000 obtained by C. F. Farmer and wife in the District Court of Dallas County, has been stopped by the granting of a receivership for the property. This action was taken by Judge W. F. Whitehurst upon application of the Power Investment Company, holder of a first lien for $10,000 upon the property. George P. Dunlap has been appointed receiver for the company.

$5,000,000 Milwaukee Bonds Offered.—A syndicate of bankers, including Dillon, Read & Company, Harris, Forbes & Company, Inc., and Spencer Trask & Company, New York, N. Y., offered for subscription on May 12 $5,000,000 of twenty-year 7½ per cent refunding and first mortgage gold bonds, series A, of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., dated June 1, 1921, and due June 1, 1941. The offering price was 95 and interest yielding more than 8 per cent. A semi-annual sinking fund will retire 2 per cent per annum of the bonds until June 1, 1926, and 1½ per cent per annum thereafter if obtainable at or under par and accrued interest. The trustee of the issue is Central Union Trust Company, New York. The bonds become a first lien on the company's entire property by Dec. 1, 1931.

$4,500,000 of Portland Bonds Offered.—The National City Company, New York, N. Y., is offering for subscription at 96 and accrued interest, yielding more than 7.85 per cent, $4,500,000 of first lien and refunding mortgage gold bonds of the Portland Railway, Light & Power Company, Portland, Ore. The bonds are dated May 1, 1921, and are due May 1, 1946. Interest is payable May 1 and Nov. 1 at the office of the National City Bank, New York. The bonds are known as series A and bear interest at the rate of 7½ per cent. The net earnings of the company are said to be more than twice the annual mortgage bonds interest charges. Associated with the National City Company in offering the bonds was Halsey, Stuart & Company, Inc., New York. The bonds were advertised for public subscription in the newspapers of May 13. In the advertisements it was explained that the Portland City Railway system is showing a substantial earning power and that the Public Service Commission of Oregon had valued the properties of the company at a figure which was more than 150 per cent of the outstanding mortgage debt including the present issue.

Southern Indiana Bonds Offered.—The National City Company, New York, N. Y., is offering for subscription $1,000,000 of first lien and refunding mortgage gold bonds of the Southern Indiana Gas & Electric Company, Evansville, Ind., the successor to the Public Utilities Company. The subscription price is 94 and accrued interest, yielding more than 8.10 per cent. The bonds are dated April 1, 1921, and are due April 1, 1941. The company owns and operates without competition the electric light, power, gas, street railway and steam heating properties in Evansville. It also does electric light and power business in nearby communities and operates an electric interurban railway. The bankers say that on the basis of appraisals by independent engineers the replacement value of the property is substantially in excess of the present mortgage debt of $5,630,000. The equity is represented by $335,000 of 6 per cent debenture bonds, $2,527,300 of outstanding preferred stock, and $3,000,000 of common stock.

Traffic and Transportation

Jitney Regulation Attacked

Operators Appeal to State Supreme Court in Effort to Nullify City's Ruling

The Supreme Court of the State of Washington set May 19 as the date for hearing the appeal of the Seattle jitney drivers from the verdict of the King County Superior Court subjecting them to regulation by the City Council. A decision is not expected, however, for sixty days, the time usually elapsing between hearing and ruling. The city was represented by George A. Meagher, city attorney in the litigation that developed last summer, when the city attempted to enforce an ordinance submitting the jitneys to drastic regulation. He argued the case before the higher court. As the case involves the city's rights to exercise police powers municipal officials are confident they will win.

Under an ordinance passed a year ago the city forbade operation of jitneys except under licenses, subject to conditions which the jitneurs alleged virtually made it impossible for them to continue running. The jitney operators sued for an injunction in the Superior Court to restrain the city from enforcing the ordinance, but the injunction was denied. An appeal was taken, and operation of the ordinance has been suspended pending the appeal, the jitney buses running without municipal supervision.

Under the ordinance requiring permits a majority of the members of the City Council last summer showed a disposition to keep all the jitneys off the streets, refusing licenses except to a few drivers, and curtailing their runs to routes that would serve as "feeders" to the municipal railway.

Ten-Cent Plea May Be Renewed

Upon motion of Judge C. P. McIntyre, special counsel for the city of Montgomery, the Public Service Commission of Alabama recently granted a rehearing of the original petition of the Montgomery Light & Traction Company for authority to advance fares to 10 cents and institute a service-at-cost plan.

May 17 was set as the date for the rehearing for the traction company and the city of Montgomery to submit further evidence in connection with the petition of the company, but this date was later changed. The petition of the company has been so amended that should the public service body finally decide it has no jurisdiction in the matter of granting a rate that will create a reserve fund for the company application will be made for a straight fare of 10 cents, or such a fare as the commission may decide is a fair and just return on the company's investment.

Ray Rushton, receiver of the railway, addressing the commission in behalf of the company, stated he was surprised that the commission had "thrown the original petition out of court" on what he termed a "technicality." A. G. Patterson, president of the commission, replying to Mr. Rushton, reiterated the commission's position that it had no jurisdiction in the establishment of the proposed service-at-cost plan. Mr. Rushton then stated that if the commission felt it was not authorized to pass upon the service-at-cost plan then he, as receiver for the company, would ask the commission to authorize a fare of 10 cents or whatever amount the commission may decide is a fair return on the investment of the company. He added, however, that he hoped the service-at-cost plan would receive the commission's endorsement, and referring to the 10-cent fare stated it is now in operation in 120 cities in the United States.

Three Cents a Mile Fare Granted for Fast Line

The Public Service Railroad, Newark, N. J., operating the so-called fast line, was allowed a three-cents-a-mile fare on May 20 by the Public Utilities Commission. The present minimum fare of 10 cents was continued.

The board held that inasmuch as the valuation made of the railroad property showed that the increase of 0.4 cents a mile was warranted and that there was no opposition it saw no reason to withhold the extra fare. Hearings will be continued, however, to fix definitely a just and reasonable fare.

In this proceeding the decision is based upon the value of the physical property of the company, which the board found to be $2,524,755. Against this are outstanding securities amounting to $2,296,650. The decision states that the value of the physical property without any allowance for intangibles of any kind is in excess of the total amount of the securities issued.

For the year 1920 the company showed a loss, after payment of operating expenses and income deductions, amounting to $66,395 and for the year 1919 the net loss was $85,313. With the increased fare proposed it is estimated that there will be a net loss of more than $9,000. The board holds, said Secretary Barber, in a synopsis, that the proposed rates are not unjust or unreasonable and will not produce an excessive return on the physical value of the property. The schedule of rates filed is allowed to become effective on June 1.

More Bus Feeders

Self-Preservation Measure Taken by Pacific Electric Railway—Six-Cent Fare with Transfers to Railway

Additional bus line feeder service has been commenced, experimentally and on a small scale, by the Pacific Electric Railway, Los Angeles, Cal., in connection with its rail lines, and in competition with motor lines, as a matter of self-protection. The present plan has in view immediate relief for the Hollywood district of the city of Los Angeles, which is at present without electric railway service.

LOCAL BODY URGED SERVICE

The appeal of the company to establish the service was made to the Los Angeles Board of Public Utilities on May 10 in the form of a request for motor bus line reaching from Sunset Boulevard and Western Avenue to the Los Felix boulevard at Griffith Park, the largest park in the city established in the outlying section, attracting a large volume of travel, but reached only by automobiles at present.

In the company's application, which is formally made by the Pacific Electric Land Company, it is stated that this motor bus service is to be operated in conjunction with the electric railway now serving the Hollywood district. Approximately 2 miles will be covered by the motor bus line. At least two motor buses will be placed on this new route when it is established. The buses will operate every twenty minutes, and during the two rush hours in the morning and evening the buses will have a headway of fifteen minutes, it is declared. During the weekdays the bus line will operate between the hours of 6.30 a.m. and 11:30 p.m.; on Sundays the hours of operation will be between 7 a.m. and 11.30 p.m. It is anticipated that a fare of 6 cents will be charged on these buses, and it is declared by the company in its application that transfers will be given on its electric car line, good for transportation on the motor buses and vice versa. The buses, it is stated, will be the latest model, with pneumatic tires and a passenger capacity ranging from nineteen to twenty-three persons. If the bus line application is granted this will make the second feeder line of the kind operated by the company as it is now operating autos between San Bernardino and Highland, some 9 miles.

THROUGH FARES NOW IN EFFECT

In this connection the company has just announced that it has published and put into effect its through fares and joint ticketing arrangements for the making of connections with the auto stages of the San Bernardino Mountain Stage Line, which operates stages from San Bernardino to a large number of mountain resorts in the San Bernardino Mountains; also, similar arrangements for the company's trains to be met by the auto stages of the Cregar Auto Stage Lines at Riverside, operating auto stage lines between Riverhead and the mountain resorts in the

San Jacinto Mountains. By this arrangement the running time is reduced 45 minutes as compared with the trip entirely by auto stage.

In discussing this question it is of interest to note that the bill to tax motor freight and passenger lines 2 per cent of their gross receipts, less local taxes, is now before the Governor for his signature. The motor transit companies claim this proposed 2 per cent tax on motor carriers would be "confiscation of property without due process of law."

New Five-Cent Lines Started by Boston "L"

A 5-cent fare for local riders will be instituted on the Medford and Somerville lines running to Sullivan Square Terminal of the Boston (Mass.) Elevated Railway on Saturday, May 28. Plans of the trustees to extend this experimental low-fare service to this district were announced in these columns several weeks ago. Six main lines, and several rush-hour tripper routes will be affected.

It is known that the trustees have under consideration plans for starting this 5-cent fare service in other districts, from time to time, unless the present experiments should prove unsuccessful. It should be understood that the regular fare for a through ride from any district to Boston, as well as regular fares on city lines, is still 10 cents. It was recently stated by General Manager Edward Dana that less than 3 per cent of the total passengers were riding for 5 cents. This change in Medford and Somerville, however, will undoubtedly increase the percentage.

In a statement issued to the public advising of the new system in Medford and Somerville, Mr. Dana said:

> This experimental method offers a means of separating through traffic from local traffic and thereby permits a different rate of fare. Its success will depend entirely upon the amount of local revenue produced.
>
> Modifications will undoubtedly be necessary as the results of the experiment are known.
>
> Sufficient new business must be secured so that the new rates of fare will not be a burden upon the present 10-cent car riders of the system.
>
> The success of the plan rests entirely with the car riders of the district, and in view of the fact that the experiment is one along broad lines of a progressive nature, if sufficient new traffic is not received it will be conclusive proof and offset previous theories.

"Ain't It Discouraging"

In a recent issue of *Trolleygrams*, a leaflet issued by the Dallas (Tex.) Railway, has this to say about presenting the exact fare as a means of speeding up traffic:

> When the car stops and there are eight or ten people waiting to get on—and you have your 6 cents in your hand—and several of your friends have their exact fare all ready—and it looks like "easy sailing"—and then a feller in front of you pulls a five-spot on the conductor and wants change—and you have your foot on the step—and the rest of the crowd is waiting in the street—Gee! Don't you wish that everybody could remember to have the exact fare ready?

Emergency Plea Disallowed

Ten-Cent Fare Refused to Public Service Railway by New Jersey Board

The application of the Public Service Railway, Newark, N. J., for permission to charge a 10-cent fare on its lines in New Jersey was denied by the Board of Public Utility Commissioners on May 20. At the present time the fare of the company is 7 cents, and it asked permission to increase this to 10 cents.

It is held by the board that no such critical condition exists in the company's affairs as would require the application of the 10-cent rate, or any other emergency rate at this particular time.

There were two proceedings pending before the board, in which the company's rates were involved. One was the application disposed of on May 20, which was predicated upon the existence of an emergency. The other is the action instituted by the board, in which it proposes to fix just and reasonable rates for the company, and in which the valuation of the line must necessarily be one of the bases to be considered.

The board in its decision stated that there have been so many variations in the rates charged by the company within the last few years that it becomes pertinent to inquire whether or not such an emergency exists as to necessitate immediate disposition. Reference is made to the fact that emergency rates were allowed the company at a time when the country was at war and a crisis was imminent.

At that time it was held that additional revenue was necessary, and the boards holds that it now must be satisfied that a similar emergency exists if any new rate is to be approved. In the pending proceeding involving valuation, a finding will result upon the full consideration of all factors, and this proceeding must be terminated not later than July 14.

In its finding the board said:

> The board is unwilling to extend the emergency doctrine made necessary, as it was, by the government increasing wages as a war measure, at least until it is shown that an increase in rates is imperatively needed to render safe and adequate service to tide the utility over until a just and reasonable rate can be fixed after all the elements involved in the making of such a rate have been considered.
>
> The board does not consider an allowance for many of these items appropriate in an application of this kind. They do not constitute elements of emergencies and more appropriately deserve consideration in the fixation of just and reasonable rates rather than "emergency" rates. The board, therefore does not approve of the schedule of rates filed by the company.
>
> Nor is there, in the opinion of the board, such an emergency present as would require it to fix any other rate in excess of the existing rate without consideration of all of the elements recognized as being entitled to consideration in a proceeding to fix a just and reasonable rate. The rate proceeding which was begun by the board and is now pending has consumed more than two years. Supplementing the vast amount of testimony as to value which has been taken in this proceeding, there has been filed with the board the valuation fixed by the engineers engaged pursuant to the legislative enactment of 1920.
>
> This proceeding must be terminated by the board not later than July 14. The case will necessarily have to be proceeded with as rapidly as possible and under all conditions a result based upon the investigation with a full consideration of the various factors necessarily requiring consideration for the fixation of a just and reasonable rate would be more just to both the public and the company than one based upon the few factors presented in and necessarily the only ones considered in emergency cases.

A writ of certiorari to review the action of the commission in refusing a 10-cent fare was granted on May 21 by Supreme Court Justice F. J. Swayze in Jersey City. Application for the writ was made by Frank Bergen, general counsel for the Public Service Corporation, of which the railway company is a subsidiary.

Edward Herman, who is the counsel for the commission, opposed the granting of the writ. He said that the investigation made by the commission showed that the company could maintain adequate service at the present rate of fare. The writ is returnable on May 28.

Thomas N. McCarter, president of the company, issued a statement to the public in which he said in part:

> A property that has been starved under forms of legal procedure for three years past can, perhaps, continue to subsist on limited rations for seven weeks more, but to the extent that the premises of the board and the legal principles adopted by the board are in conflict with the law, they should be corrected by the proper tribunal to the end that justice may be done.
>
> In substance, the board holds that, by estimating a gross increase in the company's business for the current year far in excess of that justified by the portion of the year which has expired, or by any facts indicating any such increase, and by a further paring down of the estimated operating expenses to the very bone, which, of course, must reflect itself in less efficient service, the company will have enough revenue to pay its operating expenses.
>
> And in addition to its operating expenses, the board holds that it will have enough for its fixed charges, and $510,000 for replacement and renewals. Not a cent is provided for return upon the stockholders' investment of $50,000,000.
>
> Under these conditions, the company is without credit and unable to obtain capital. If the basis on which this report is made can be sustained, and is to be a criterion of operations directed by the board, there is no hope for the Public Service Railway, and, in my opinion, none for the public regulation of utilities.

Toledo Bus Men Attempt to Trick City

Bus owners of Toledo, Ohio, have failed in their attempt to bring to a referendum vote the regulatory measure passed recently by Council at the solicitation of Street Railway Commissioner W. E. Cann. They will have until June 1 to secure their licenses and indemnity bonds. This was determined at a conference of city officials Saturday.

The bus men had organized and submitted a petition to the electorate, but when the 17,498 names were checked over by City Clerk Albert Payne it was found that not more than 4,575 were bona fide signatures. This lacked 2,084 of the legal number to bring a vote on the ordinance.

The ordinance is to be defied by the bus drivers, according to one of their attorneys. However, the city police department is ready to enforce the ordinance and the buses will be fined $100 to $500 for operating after June 1 without a license.

Jitney Fight in Birmingham

The fight over jitney regulation in Birmingham, Ala., will probably begin when H. P. Burruss introduces an ordinance drawn by the city attorney providing for a liability insurance amounting to $5,000. J. Weatherly, representing the jitney operators, will defend the present system.

The matter recently came to a head after an inspection of all the public utilities in Birmingham by the State Public Service Commission. The commission found that unrestricted jitney operation was taking too much revenue from the Birmingham Railway, Light & Power Company, the local company in Birmingham, and that another increase in fares was imminent unless something was done to relieve the financial distress of the company.

Associate Cooper's report follows in part.

> Relief from the disturbing conditions in the company's finances must come through readjustments which will give the company reasonable revenue without decreasing the service. It seems to me the solution of the problem must be in the regulation of those agencies in Birmingham which are now taking the short hauls from the company, the operators of automobiles for hire or the so-called jitneys. The commission found that operators of jitneys were obtaining the cream of the business on the short hauls, leaving the long hauls to the street railway. For instance, not many months ago the paving of Tuscaloosa Avenue in West End was completed. Since that time the revenue from the West End line of the street railway has shown a decrease of about 30 per cent. This decrease has resulted from the operation of jitneys on Tuscaloosa Avenue to the end of the pavement.

Dallas Denied Seven-Cent Fare

One of the last acts of the retiring city administration in Dallas, Tex., was to refuse to grant the application of the Dallas Railway for authority to increase its fares from 6 cents to 7 cents. The application had been pending for several months during which time the City Commission had conducted exhaustive investigation into the financial status of the traction company.

The commitments and promises made by the Strickland-Hobson interests in securing the present franchise in 1917 were also investigated and the traction company was shown to have failed to carry out all these promises. Lack of funds was pleaded as an excuse and this in turn was used to show the pressing need for additional revenue. The traction company has filed with the new city administration a motion for rehearing.

The action for a rehearing is taken under a provision of the recently enacted charter amendment which provides that any public utility must file motion for rehearing with the city commission before it is permitted to take an appeal to the Federal court. This action is believed to be preliminary to an appeal to the Federal court on the plea that the present fares in Dallas are confiscatory in that they do not permit an adequate return on invested capital. Traction company officials some time ago intimated that if the city refused to grant the increased fare the case would be taken directly to the Federal court in an effort to get needed relief.

The board of city comissioners in refusing the application for a 7-cent fare for the railway went on record as recommending to the new board of city commissioners that if it is shown that the traction company needs more revenue after the permission for the 6-cent fare expires on June 25 an extension of twelve months be made on the 6-cent fare agreement. When the railway company was given permission to inaugurate a 6-cent fare such permission was limited to one year, but the company was given authority to ask an extension of twelve months after the expiration of the year.

Jitneys a Menace in Indianapolis

H. O. Garman, chief engineer of the Public Service Commission of Indiana, in an address on May 20 declared that the jitneys are taking away from the Indianapolis Street Railway between $600 and $700 every day. He firmly believes that the jitney buses caused the decline in the revenue of the railway which necessitated an increase in fare. Mr. Garman brought out in his address the result of a recent informal conference between members of the commission and officials of the railway.

Evidence was submitted indicating that present rates are inadequate and that the company will face a deficit at the end of the year under present operating conditions.

Mr. Garman said it is his belief that the jitney should be eliminated. Perhaps the city officials who are opposing additional fare increases could refuse to permit the jitneys to operate over the streets.

Dr. Henry Jameson, chairman of the board of directors of the railway, when informed of Mr. Garman's statement, said:

> If the city is going to continue to have street car service it's got to do something on this jitney proposition, and do it pretty quick. I would not go so far as to say a return to 5-cent fares would follow immediately an order prohibiting operation of jitney buses. I do, however, believe such a decrease would result eventually. The company has been coming out on the red side of the ledger for the greater part of the last six months. We never have been able to show a satisfactory balance. Until we can show a surplus of between $200,000 and 300,000 we will be unable to obtain the extended credit necessary to provide improvements.

The present fare of 6 cents, with a 1-cent transfer charge and provision for the sale of twenty tickets for $1, has been continued by the commission until June 1.

Third Arbitrator Still Unselected

Charles Currie and Judge S. W. Crawford, representatives of the Northern Ohio Traction & Light Company, Akron, Ohio, and the unions respectively, have been unable to agree upon the selection of a third arbiter to settle the wage dispute now pending. It is likely that the third arbiter will have to be appointed.

Commission Bill Being Jammed Through

The bill before the Illinois Legislature which would abolish the present utilities commission and create the Illinois Commerce Commission with greatly reduced authority was passed by the house on May 25 by a vote of 100 to 23. It was jammed through as an administration measure, having been heralded as carrying out Governor Small's pre-election pledge. The bill will come before the senate during the week commencing May 30.

Transportation News Notes

Seven Cents Asked in Duluth.—The Duluth (Minn.) Street Railway has filed a request for an emergency fare of 7 cents or four rides for 25 cents with the State Railroad & Warehouse Commission. The request was filed in informal form only. Later papers setting forth in detail the financial needs of the company will be filed with the commission.

Railway Reduces Rate.—L. E. Myers, president of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., announced that the fare would be reduced to 6 cents in Ironwood, effective May 9. The fare between Ironwood and Bessemer has been reduced 1 cent for each zone, making the new rate 18 cents instead of 21 cents. The reduction was made voluntarily by the company.

Asks to Run Bus Line.—The Springfield (Mo.) City Council has been petitioned by the Springfield Traction Company for permission to discontinue service on Center Street and to substitute bus service. The company states that modern auto buses would be procured and that a 5-cent fare would be charged with an additional 2 cents for a transfer to any other company line. The line is known as one of the short lines of the railway, and has been operated at a loss for some time. No action has been taken by the City Council.

Jitney Hearing Continued.—A hearing before the Board of Public Utility Commissioners of New Jersey took place on May 9 at Camden relative to licenses issued to jitney operators after March 15, which was the limit placed by the law when buses would be allowed to run on streets where there were trolley tracks, without the permission of the commission. The hearing will be continued, but tentative rulings were made relating to the operation of the Swedesboro and Blackwood buses. It is understood these buses will be allowed to operate provided they do not pick up and discharge passengers for rides wholly within the city limits.

Safety Islands for Columbus.—The Columbus Railway, Power & Light Company, Columbus, Ohio, may have "safety islands" for the benefit of pedestrians and car riders at High Street stops. The Columbus Automobile Club has asked Council for permission to construct the "islands." It is planned, if Council agrees, to construct "islands" at the two stops at Broad and High Streets, in the city's center, to test them out.

First Safety Contest Successful.—The first safety contest on the lines of the Southern Public Utilities Company in Charlotte, Winston-Salem and Greenville ended on Feb. 28 with the city of Charlotte making the best showing. A summary of the accidents shows that during the four months of the contest there were 97 accidents at Charlotte, 125 at Winston-Salem and 184 at Greenville. In all $1,635 prize money was awarded. The contest was so successful that the president of the company authorized the expenditure of $1,500 in a second contest which was scheduled to start April 1.

Needs Increased Rates.—The Ontario Government, owner of the Nipissing Central Railway, North Cobalt, Ont., recently applied to the Dominion Board of Railway Commissioners for an order authorizing a 25 per cent increase in passenger rates on this line. In the application it was stated that last year the net deficit on passenger traffic alone came to $21,024, while for the five months ended March 31 last the deficit reached $18,000. Several towns on the route opposed the increase. Assistant Chief Commissioner McLean suggested that the question of reducing service should precede the raising of fares.

Eight-Cent Fare Extended. — The Missouri Public Service Commission recently authorized the extension of the 8-cent fare in Kansas City for six months from April 8. In extending the present Kansas City carfare for another six months, the State Public Service Commission has issued a statement that the last four months indicate the company now has an annual net income slightly less than $1,000,000, while the company's indebtedness carries an interest charge of about $2,000,000, now in default.

Seeks Ten-Cent Rate.—The Southwest Missouri Railroad, operating in Jasper County, Missouri, and into the mining districts of Kansas and Oklahoma, has filed a petition with the Missouri Public Service Commission asking for an increase in passenger rates between Carthage and Joplin to 10 cents. The fare has hitherto been 1⅔ cents a mile. Much of the prosperity of the mining regions has departed, the petition recites, as the sharp drop in the price of lead has practically depopulated many of the towns. The company lost $8,212 in March, 1921, as the result of its operations between Carthage and Joplin.

Fare Raised to Seven Cents.—The State Public Utilities Commission has authorized the Nashville Railway & Light Company, Nashville, Tenn., to charge a straight 7-cent fare at Nashville in lieu of the four tickets for a quarter heretofore in vogue. Tickets will be issued five for 35 cents. The new rate was ordered for May 8. The utilities commission will retain jurisdiction of the case for such other and further orders as the conditions may warrant from time to time. Rates stand to be adjusted so as to give a return of not less than 6 per cent nor more than 7½ per cent on valuation as made several months ago.

Fare Increase Protested. — Through the instigation of a number of patrons of the Valley Railways, serving the Cumberland Valley in Pennsylvania from Harrisburg, an appeal will be made on the recent decision of the Public Service Commission allowing the railway to increase its fare from 7 to 8 cents. In all probability the Superior Court of the State will be asked to overrule the Public Service Commission on the ground that the increase is unjustified on account of decreasing cost of materials. This is the same ground cited by the commission in refusing the increase appeal of the Pennsylvania-Ohio Electric Company, operating in the city of New Castle, Pa.

Eight Cents in Helena.—The Montana Railroad & Public Service Commission has given permission to the Helena Light & Railway Company, Helena, Mont., to charge an 8-cent fare on its city lines. The East Helena fare will be 15 cents. The higher rate in the city will have a sixty-day trial beginning May 20. Provision has also been made for commutation tickets—forty for $2, to be used within 15 days. These will be issued in place of the present tickets, which are forty for $2.50, or 6¼ cents each. The company recently petitioned for a 10-cent fare, claiming that the award of the commission last July granting a 7-cent fare with a 6¼-cent ticket rate did not net a reasonable return.

Wants Increased Rates.—The Lynchburg Traction & Light Company, Lynchburg, Va., recently petitioned the State Corporation Commission for an increase in railway rates from 5 cents to 6 cents on both city and suburban lines. The company had asked for a 6-cent fare over all its lines and according to the franchise between the city and the traction company, the Council has permission to increase the rates. However, the City Council declined to grant the increase and accordingly the company petitioned for an 8-cent fare outside the city limits of Lynchburg. At a recent hearing befor the commissioners former Senator Aubrey E. Strode appeared for the County of Campbell protesting against the proposed increase. The commission adjourned the case until June 1, when further opposition will be heard. A digest of the valuation figures of the Lynchburg property was published in the ELECTRIC RAILWAY JOURNAL for May 14.

Petitions Council for Increased Rates.—The Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has petitioned the City Council of Buffalo for a 10-cent fare and abandonment of the transfer exchange with the International Railway. The company leases to the Buffalo & Lake Erie Traction Company the right-of-way along the Hamburg turnpike to the city line at Lackawanna. Under the franchise provision was made for a 5-cent fare only with an interchange of transfers between Buffalo & Lake Erie and the International Railway. There has been no local service for more than a year, which fact will be used by the city as an argument against the traction company. Under a decision of the Court of Appeals the old commission lacked authority to raise the fares. The new commission can suspend franchise obligations. An appropriation of $5,000 was authorized to oppose the petition for increased rates.

New Publications

Maintenance of Way Cyclopedia

Compiled and edited by E. T. Howson, editor *Railway Maintenance Engineer;* E. R. Lewis, formerly chief engineer Duluth, South Shore & Atlantic Railroad, and K. E. Kellenberger, editor *Railway Signal Engineer*, assisted by Homer Hughes, formerly assistant field engineer Interstate Commerce Commission, in co-operation with a committee of the American Railway Engineering Association. Published by Simmons-Boardman Publishing Company, New York, N. Y.

As stated on its title page, this is a reference book covering definitions, descriptions, illustrations and methods of use of the materials, equipment and devices employed in the maintenance of the tracks, bridges, buildings, water stations, signals and other fixed properties of railways. The volume is composed of two general divisions, the illustrated text and the catalog section. More than 2,500 illustrations are employed, and the illustrated text is separated into sections corresponding to the several subdivisions of maintenance-of-way work, including tracks, bridges, buildings, water service, signals and wood preservation. There is also a general section including the devices commonly used in railway work. A directory is appended giving names of manufacturers of the products included in the cyclopedia. While the articles in the several sections are arranged alphabetically by titles, there is also a complete general subject index which will facilitate the use of the volume. In the space available here it is impracticable to review the contents of this valuable compilation, which will be useful in supplying definitions and reference information to electric railway engineers who are responsible for tracks, buildings, signals, etc.

Personal Mention

Mr. Sprague Honored Again

"Father of Electric Traction" Awarded Franklin Medal in Recognition of His Scientific Attainments

Frank Julian Sprague, who was awarded the Franklin Medal, with unanimous election to honorary membership, by the Franklin Institute on May 19, in addition to his pioneer work with the electric motor has had a hand in a large part of the electric railway development which has occurred in this country. A summary of his connection with several significant enterprises in this field, which has earned him the sobriquet of the "father of electric traction," was included in the address delivered on the occasion of the presentation of the medal and abstracted elsewhere in this issue.

FRANK J. SPRAGUE

Mr. Sprague was graduated from the United States Naval Academy in 1878, at the age of twenty-one. He was appointed to the Academy from Massachusetts, to which state he had moved in early youth. Five years after graduation he resigned from the Navy to join the technical staff of Thomas A. Edison, with whom his duties related principally to lighting matters, to which he made essential contributions. His main interest was even at this early date in the application of electricity to power purposes, both industrial and for traction, and within a year he had organized a company to carry on this work. His indomitable energy, as potent today as it was thirty-seven years ago, enabled him to overcome heart-breaking obstacles. His work developed logically along the lines, first of the application of new types of the electric motor to general industry, and then successively to the trolley, rapid transit and steam railway electrification. Meanwhile he developed an electrical system of elevator drive and control, the problems of which were analogous to those of traction. At present he is concentrating attention upon a system of speed control and automatic brake application on steam trains, to which he has given the past eight years.

During his vigorous career Mr. Sprague has been honored in many fields. He was awarded a gold medal at the Paris Exposition in 1889 and the grand prize of the Louisiana Purchase Exposition in 1904; and also in 1910, from the American Institute of Electrical Engineers, of which he is a past-president; the Edison medal "for meritorious achievement in electrical science, engineering and art, as exemplified in his contribution thereto." He is also past-president of the American Institute of Consulting Engineers, the N. Y. Electrical Society and the Inventors' Guild, was a member of the Naval Consulting Board during the war and has acted as consultant on some of the most important electrification projects.

The Franklin medal, which is one of the highest world awards, is the second medal awarded to Mr. Sprague by the Franklin Institute, the former being the Elliott Cresson medal, which he received in 1904 for his development of the multiple-unit system of railway control. The Cresson medal recognizes "some discovery in the arts and sciences, or the invention or improvement of some useful machine, or some new process or combination of materials in manufactures, or ingenuity, skill or perfection in workmanship."

The Franklin Medal is awarded annually from a fund founded by Samuel Insull "to those workers in physical science or technology, without regard to country, whose efforts . . . have done most to advance a knowledge of physical science or its applications," and was given to Mr. Sprague "in recognition of his many and fundamentally important inventions and achievements in the field of electrical engineering, notably his contributions to the development of the electric motor and its application to industrial purposes, and in the art of electric traction, signally important in forming the basis of world-wide industries and promoting human welfare."

The meeting of the Institute on May 19 was a notable affair, attended by General John J. Pershing, who was made an honorary member of the organization; Ambassador Jules Jusserand of France, who accepted the same honor and the Franklin Medal on behalf of the distinguished French physicist, Professor Charles Fabry of the University of Paris, and many other celebrities. A paper by Professor Fabry was read by Professor J. S. Ames of Johns Hopkins University and Mr. Sprague gave an abstract of an extended paper on the history and prospects of electric traction.

Opens Consulting Office

S. H. Grauten, Who Redesigned Kansas City Railways Distribution Systems, Has Resigned

S. H. Grauten, electrical engineer and head of the research and consulting department of the Kansas City (Mo.) Railway, left the service of that company on April 15. Mr. Grauten has opened a consulting electrical engineering office in Kansas City. He has signed contracts to act as electrical engineer for the Kansas City Western, the Kansas City-Kaw Valley & Western, and the Pittsburg and Joplin Railways, and also for several other roads.

While with the Kansas City Railways Mr. Grauten had charge of the redesigning and construction of the entire distribution system, which included the rearrangement of substations and the installation of new ones. Some of these were automatics and were among the first to be installed in the United States. His duties included preparing the estimates, specifications, plans and contracts, and supervising the construction. In 1918 he was also responsible for the operation of the distribution system, involving power dispatching, substations and the transmission system. At the same time he was also engaged in an electrolysis investigation in connection with engineers of the United Gas Improvement Company and the research committee of the American Committee on Electrolysis.

S. H. GRAUTEN

An article appeared in the JOURNAL of Dec. 11 under Mr. Grauten's name in which he described the most recently completed substation, where there were incorporated several unusual features of building design and equipment.

Since his graduation from the University of Illinois in 1907 Mr. Grauten's experience has been wide. His first year out of school was spent at the Massachusetts Institute of Technology at Boston as an instructor. Following this he entered the electrical department of the New York Central in connection with the electrification of the Grand Central Terminal, where he acted as engineering assistant to the superintendent of power. After four years of this he went to the Panama Canal.

There he had charge of putting into service and making the tests of the entire electrical and mechanical equipment at the Gatun Locks hydro-electric plant and spillway. Mr. Grauten was in charge of the operation of the Gatun Locks from the passage of the first boat on Sept. 18, 1913, until the appointment of an army captain to that position in May, 1914.

Mr. Grauten Very Popular

From September, 1914, to May, 1916, Mr. Grauten was with the Public Service Company of Northern Illinois, under J. L. Hecht, assistant to the president. He was employed on appraisal work and later on substation design, being in charge of this work during 1915-16.

Mr. Grauten was very popular with the organization at Kansas City and his leaving is a matter of regret to every one connected with the company. Although a highly technical engineer both by education and training, Mr. Grauten had the happy faculty of combining technical engineering with practical operation in a manner to secure the best results.

H. E. Blain, C. B. E., assistant manager of the London Electric Railway, sailed from England on May 25 for New York on the Olympic. He expects to remain in this country about six weeks, and will study recent developments in American traction systems.

Reinier Beeuwkes, chief electrical engineer of the Chicago, Milwaukee & St. Paul Railroad, who has recently been given a several months leave of absence, sailed from New York City on May 11 for Panama and South American ports.

Walter Jackson, consulting engineer, sailed May 24 for Europe on the *Aquitania* for a tour of the United Kingdom and the principal continental cities to make further first-hand studies of the latest developments in fares, transportation salesmanship, motor buses and trackless trolleys. He does not expect to return to the United States for several months.

Edgar Blessing, Danville, Ind., an attorney, has been appointed by Governor Warren T. McCray to membership on the Indiana Public Service Commission. He succeeds E. I. Lewis, who resigned to become a member of the Interstate Commerce Commission. Mr. Blessing, whose term will expire May 1, 1923, will assume his duties with the commission June 1.

L. H. Appel has been appointed assistant electrical superintendent of the Pacific Electric Railway. Mr. Appel first affiliated himself with the Pacific Electric Railway in June, 1912, under S. H. Anderson, electrical superintendent. He served in the capacity of operator, electrical inspector, estimator and power clerk. In December, 1915, he was advanced to the position of chief clerk to the electrical superintendent, in which capacity he served until April 1, 1921, when he was promoted to his present position.

Obituary

Col. J. F. Strickland

All Texas Mourns Death of Eminent Utility Promoter, Financier and Operator

Col. J. F. Strickland, president of the Dallas (Tex.) Railway, the Texas Electric Railway, and several other utility companies, recognized as one of the leading traction men of the entire country, died suddenly at his home in Dallas on May 21. Death was due to an attack of illness affecting the heart.

COL. J. F. STRICKLAND

Colonel Strickland was 60 years old, and at the time of his death could look back from a position of power in the traction world over a path of remarkable successes that come to few men. Born in Alabama, he early in life decided to come to Texas, and borrowed money to make the trip. His first work was on a farm near Waxahachie, where he saved his money and soon had sufficient capital to enter the cotton ginning business at Avalon, a small village near Waxahachie. Later he engaged in the wholesale grocery business under the firm name of J. F. Strickland & Company. In 1897 Col. Strickland entered the utility field as manager of the Waxahachie Light & Power Company, in which position he continued until 1902 when he became associated with Judge M. B. Templeton, Dallas, now head of the legal department of the Strickland interests, and Ocie Goodwin, also an official of the Strickland companies.

These three men conceived and carried through the idea of a central electric generating plant to supply current for a number of northern Texas cities out of which eventually grew the present great company known as the Texas Power & Light Company.

At this time the territory north of Dallas appealed to the three men as a field of large possibilities for interurban lines, and they began to lay plans for building interurbans which today are consolidated into the Texas Electric Railway, one of the longest interurban lines in the world. In 1904 the Texas Securities Company was organized to own the stocks and to finance the various projects which these men were planning.

In 1906 the preliminary work of constructing the interurban line from Dallas to Denison was begun and the Texas Traction Company was organized with Col. Strickland as president. It is generally conceded that it was due largely to the tenacity of purpose and broad vision of Col. Strickland that the money was procured to complete the line, which was put into operation on July 1, 1908.

The next large venture of Col. Strickland was the organization of the Texas Light & Power Company, under which organization electric current for lighting and power is supplied to more than 100 cities and towns of northern Texas and power for the operation of the interurban lines of the Strickland interests is generated.

Organization of the Southern Traction Company was the next big venture, and in 1912 the interurban lines from Dallas to Waco and Corsicana were completed and put in operation by this company. The Texas Traction Company and the Southern Traction Company were later consolidated into the Texas Electric Railway and the interurban line from Denison to Waco operated as a unit with through service from one of the lines to the other.

In 1916 Col. Strickland, at the request of the city officials of Dallas, undertook the work of developing franchises granted by the city of Dallas to the electric light company of the city. Service had been poor and unsatisfactory and the city officials turned to a man who they believed would be able to bring order out of chaos and give the city adequate service. The Dallas Power & Light Company, one of the most successful lighting and power companies of the entire state, attests the genius and ability of the man the city officials had chosen.

About this time the four street railways operating in Dallas were consolidated under the direction of C. W. Hobson of the General Electric Company. Just before the consolidation was effected Mr. Hobson discovered that he would be unable to take control of the lines as he had planned, and Col. Strickland was persuaded to take over the lines. The Dallas Railway was organized with Col. Strickland as president, under the so-called service-at-cost franchise granted in October, 1917.

Under the commitments made at the time the traction franchise was granted in 1917, Mr. Strickland was compelled to build two interurban lines each at least 30 miles long into the city of Dallas, and he recently organized a company to build an interurban line from Dallas to Terrell. Work on this line is now under way.

At the time of his death Col. Strickland was president of seven utility and allied companies in Dallas.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Lower Prices No Stimulant to Line Material Demand

Last Decrease of 6 to 9 per Cent the First of This Month Makes Third This Year

Price reductions on overhead copper line material have failed to stimulate buying to any degree as yet. The last reduction was made by producers around the first of this month, the decrease taking effect on April 29 in one instance and on May 5 in a couple of others. This decrease, which is the third since the first of the year, amounted to from 6 to 9 per cent and covered both bronze and malleable iron material. The discount allowed by one producer on a certain item in this field shows the trend of prices very well. The peak appears to have been reached about last July when in this one representative instance the discount went from 20 to 10 per cent. It remained there until January, 1921, when it went to 15 per cent, in February it increased to 20 and with this last price decrease goes to 25 per cent.

Buying continues to be for maintenance only, though a slight improvement recently in that respect is noted in one or two quarters. The general market remains quiet, however, with railways not endeavoring to stock ahead. Some consumers, it is stated, are still looking for lower prices, but on the other hand, a representative producer states that this last price decrease was made more in an attempt to induce buying rather than because of lower costs.

Stocks of standard finished products and semi-finished material in this field are good, with prompt deliveries prevailing. Some manufacturers are continuing production on a basis whereby demand is expected to increase materially later in the year.

Electrolytic copper is stronger again with producers quoting 13.37½ cents to 13.50 cents for spot, May and June delivery.

Lower Prices on Brass

Buying, Although Light, Is Better Than It Was in April

Reductions in brass prices of the order of 1 cent per pound were annouced last week in manufacturing circles. Makers of schedule material expressed to the ELECTRIC RAILWAY JOURNAL their satisfaction in this reduction upon receipt of the new price lists. At present business in the brass field as related to electrical production is much below normal, but a leading producer of socket-shell material said last week that the May business had been considerably better than that of April. The chief demand just now is for copper products. Competition for business is very acute. Reductions in wages and salaries of the order of 10 per cent have lately been made in the brass industries, and some of the mills are running on half to two-thirds time. A 10,000-lb. order looks large today.

There has been no change in the price of copper products since April 18, according to a representative manufacturing establishment. The new base prices for brass in quantity lots as issued by a leading house are as follows: Sheet metal, high brass, 16¼ cents per pound; low brass, 17¾ cents. Wire, high brass, 14¼ cents; low brass, 18¾ cents. Rods, high brass, 14¼ cents; low brass, 18¾ cents. Brazed tubes, brass, 27½ cents. Seamless tubes, high brass, 20 cents; low brass, 21½ cents; copper, 22 cents.

Rail Mill Operation at Higher Capacity Than Other Steel Business

Sizable Orders for Both T and Girder Rails Placed Early This Year Keep Plants Fairly Busy — Present Buying Is Light Though Improvement Is Expected This Fall

Steam railroads have ordered steel rails this spring comparatively better than electric lines, according to reports received from producers. The tendency of electric traction companies has been to hold off buying and though there is undoubtedly a tremendous potential need for girder rails throughout the country, it has not resulted in heavy buying. The same is more or less true in the steam road field, only with this difference—steam railroads have ordered only for maintenance too, but their absolute repair needs have so accumulated that the tonnage placed has been considerable.

The standard T-rail business of mills at the present time is in much better shape than other classes of steel business. Around the first of the year sizable orders were placed, the buying coming early and largely at one time. The same is true of girder rail orders; a fair tonnage was placed early this year, and these orders are now keeping mills fairly busy. Unfortunately, however, at the present time there is hardly a thing in sight in the way of new business and when present orders on the books are filled it looks as if rail departments will be in the same condition as the other classes of the steel business.

Of course production even now is by no means at capacity and it is very possible that operation can be strung out until business improves. In fact, rail producers in several instances are counting upon this fall to develop good buying. By that time the all-important wage decision, which it seems will be in favor of the railroads, will have had time to make itself felt.

Foreign buying is flat for there is considerable competition offered by rail mills abroad whose output is greatly favored by prevailing exchange rates, and customers seem to be waiting for lower prices to develop here. In this connection a South American country has recently placed an order for more than 4,000 tons of steel rails with a German company at a price which American producers could not meet and at the same time the seller extended longer credit terms than Americans are accustomed to do.

The market for open-hearth rails in this country remains unchanged at a price of $47 per ton. Girder rail prices are not uniform at present but on a recent order for 100 tons of a 122-lb. grooved girder rail a price of about $65 per ton was made, while for 200 tons of a 140-lb. guard rail section the price was about $93.25 per ton. Labor costs are now considerably lower in this field, for with the wage cut of 15 per cent inaugurated by the U. S. Steel Corporation, all producers have reduced wages from 15 to 20 per cent and some of the independents have recently announced a second reduction. Shipments at the present time are prompt and in general average from 4 to 6 weeks.

Some Further Data on Raw Material Costs

Increases Over Pre-War Prices Appear to Be Still Above Those of Finished Products

Prices of raw material used by manufacturers in the electric railway field have of course receded within the past few months and discussion is frequently heard as to whether reductions in the cost of materials have not outstripped the decreases that have been passed on in the finished products. In this connection it is interesting to get a line on where material costs stand at the present time compared with prewar prices.

The table which is presented here gives the cost of certain materials purchased as late as May, 1921, compared with the middle of 1915, which materials go into the makeup of electric railway products.

	Increase. Per Cent
Pig iron	180
Steel plates	101
Copper	12
Steel castings	180
Coke	150
Mica	83
Asbestos insulation materials	395
Other insulation materials	156
Magnetic sheet steel	221

Turning to the status of present prices of several finished products compared with pre-war prices, an increase of 120 per cent is shown on car equipments; electric locomotives, 120 per cent; rotary converters, 117 per cent; switchboards, etc., 120 to 146 per cent, according to the labor content and materials used.

Reduction of prices, according to the same source of information as the above figures, will probably be gradual, depending upon decreases in labor cost throughout the country, declines in raw material cost and increased production. As long as production is low, opportunities for lowering prices, it is stated, are very limited. The problem confronting the average buyer is to determine the value and earning power of new equipment during the next six to ten months and compare this with a possible price reduction of 8 to 10 per cent that might be gained by holding off from buying for that length of time.

Interest Being Displayed in Steel Tower Market

Although Activity Is Not Pronounced, Utilities Are Keeping in Close Touch with Transmission Market

A survey of the foreign and domestic market for steel transmission towers reveals fairly uniform conditions among producers. Present activity at home and abroad is very light, there being little or no demand for this class of material as yet this year. Furthermore, there does not seem to be much prospect of greater buying developing later in the year, for customers are still holding off for lower prices and difficulty in financing new transmission projects continues to retard the market.

In view of the position of this market as a barometer in the electrical industry, however, it is gratifying to note that producers are generally quite optimistic over the future. At the present time several companies report that they are receiving a large number of inquiries both in the United States and from foreign countries. Actual orders, as stated heretofore, are not being placed, but at the same time the pulse of the market is being closely felt and interest on the part of central-station companies and electric railways is considerable. From all accounts it seems that there is a large potential demand being held in abeyance.

The average base price on galvanized material used in fabricating steel towers is now said to be about 7 cents. There does not seem to be much chance of further price decreases being made, it is stated, unless steel declines further. The extent of price reduction made by different producers varies somewhat, but in a representative instance prices have receded approximately 30 per cent from the peak reached about one year ago. This figure is based upon the cost of one particular job which was figured last spring and finally held over until this year.

Deliveries can be made promptly, for though the finished product is not stocked, steel mills are keen for business and fill orders in quick time. Some producers are also carrying good stocks of material ready for fabrication.

Railway Supplies for Ecuador

The National Tramway Company in Quito, Ecuador, is in the market for tramway materials, railway tools and equipment and hydro-electric plant supplies, according to the Guaranty Trust Company, New York.

Electrification of Railways in South Africa

Tenders will be received by the High Commissioner for the Union of South Africa, Trafalgar Square, London, Eng., or at the office of the general manager, Johannesburg, South Africa, until July 5 for equipment, switchgear and accessories, etc., in connection with the electrification of the Cape Town-Simonstown and the Durban-Pietermaritzburg railway lines. Specifications, etc., at the above offices. Further information on application to Merz & McLellan, consulting engineers, 32 Victoria Street, S. W., 1, London, Eng.

Bids for the Electrification of Santiago-Valparaiso Railway

Bids will be taken by Railway Council until June 30, 1921, for the electrification of the first zone of the railway running from Santiago to Valparaiso. The cost, including electric locomotives, is estimated at 40,000,000 pesos.

Rolling Stock

The Tiffin, Fostoria & Eastern Electric Railway Company, Tiffin, Ohio, has just placed an order with the Differential Steel Car Company for one new dump car.

The Southern Pacific Railway, according to J. A. Ormandy, assistant general passenger agent, will put 12 new cars in operation on the Portland (Ore.)-Corvallis line about July 15. The new cars will cost $37,000 each, about double what the ones now in operation cost the Southern Pacific.

Canadian National Railways, Toronto, Canada, is testing an electric storage battery car on its tracks between Trenton and Belleville. The car is operated by Edison batteries which it is said will drive it 140 miles on one charge. Maximum speed on level track is given as 40 m.p.h.

The Municipal Railway System, San Francisco, Cal., mentioned in the May 7 issue as completing arrangements for purchasing about 30 new cars, has issued the following information regarding these:

Number of cars ordered	20-30
Type	Center entrance; center exit
Seating capacity	32
Weight	26.200 lb.
Length over all	29 ft. 10 in.
Truck wheelbase	12 ft. 0 in.
Width over all	8 ft. 8½ in.
Height, rail to trolley base	10 ft. 2 9/16 in.
Body	Semi-steel
Interior trim	Birch
Roof	Arch
Air brakes	Westinghouse
Axles	A. E. R. E. A. Standard E-4
Bumpers	Cast steel
Car signal system	Consolidated
Car trimmings	Bronze
Control	K 36 J R
Curtain fixtures	National Lock Washer Company
Curtain material	2-ply Fabrikoid
Designation signs	Hunter
Fare boxes	Johnson
Fenders or wheelguards	Eclipse
Gears and pinions	Helical
Hand brakes	Peacock Staffless
Headlights	Golden Glow
Journal boxes	Brill
Lightning arresters	None
Motors	2 Westinghouse 532A Inside Hung
Registers	None
Sanders	Air
Seats	Hale and Kilburn
Seating material	Rattan and 3-ply Veneer
Step treads	Mason Safety
Trolley catchers or retrievers	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	Kalamazoo
Trucks	Brill Radiax E-1
Ventilators	Gartland
Wheels	26 in. Steel

Franchises

Walla Walla Valley Railway, Walla Walla, Wash.—The Walla Walla Valley Railway, through C. S. Walters, general manager, has made formal application for a franchise from the county commissioners for operation of a trolley line on East Alder Street and Pacific Avenue, from the city line to the natatorium. The franchise is sought from the county because the extension is beyond the city limits.

Tacoma Railway & Power Company, Tacoma, Wash. — Arrangements for street railway service into the North Stevens Street, or the College of Puget Sound district, are being completed, and the City Council has notified the state department of public works that the Council will grant the Tacoma Railway & Power Company a franchise to operate a car line on the proposed route of the Sixth Avenue extension, if the department grants the request of the citizens that the company be directed to give them service. The route to be followed has been agreed upon by the various interests involved.

Recent Incorporations

Abilene (Tex.) Traction Company.—The Abilene Traction Company has been chartered with a capital stock of $100,000. It will take over the property of the old traction company which failed and which has not been operated for two years or more. The incorporators are J. N. Burjacs, Price Campbell and G. W. Fry.

Track and Roadway

Miami Beach Electric Company, Miami, Fla.—Permits have been secured from the county commissioners for four turnouts on the Miami-Miami Beach electric line, and J. H. McDuffee, treasurer of the Miami Beach Electric Company, announces rolling stock has been ordered along with material for the sidings, preparatory to making the service between Miami and the beach a ten-minute schedule instead of twenty minutes as at present.

Indianapolis (Ind.) Street Railway.—The placing of new special work in car tracks in Indianapolis at Illinois and Thirty-fourth Street, which will make possible the routing of Mapleton cars over Illinois Street, instead of Central Avenue, and also the operation of a crosstown line in Thirty-fourth Street, will start June 15 and be rushed to completion, officers of the Indianapolis Street Railway Company told the board of public works on May 12. The company reported that considerable progress has been made in the rebuilding of the tracks in West Washington Street, from Belmont to Harris Avenue. As soon as this work is done the company will start the rebuilding of the tracks in Delaware Street from Massachusetts Avenue to Washington Street.

Detroit, Mich.—The Department of Street Railways, City of Detroit, expects to build 82 miles of single track this summer, with International steel twin ties and 93-lb. and 100-lb. T rail with concrete foundation. The overhead will call for tubular steel poles in the central district, cedar poles in the outlying districts, feeder cable, 2/0 trolley wire, hangers, gears, span wire, strain insulators, various pole line hardware, etc.

Detroit (Mich.) United Railway.—The Detroit United Railway has received the approbation of the Flint Common Council in the matter of temporary construction for the line on Bray Avenue from Saginaw Street to Flint Lake Park. Owing to the expense of new material the company will use old rails and other materials on hand. This construction is permitted for a period of five years.

Southern Public Utilities Company, Charlotte, N. C.—Large track building and paving will be started soon by the Southern Public Utilities Company in Winston-Salem. The tracks on Liberty Street will be relaid for a distance of approximately one mile.

Power Houses, Shops and Buildings

Central Maine Power Company, Augusta, Me.—The Central Maine Power Company will build a new substation in Augusta at the corner of Bangor and Lock Streets. The new building will be of tapestry brick with a roof of green tile. The change in location has given the company an opportunity to improve its local service by the addition of modern bus structures, new transformers and new wiring.

Detroit, Mich.—The Department of Street Railways, City of Detroit, has practically completed plans for the construction of a new office building, a carhouse and outside storage for 200 cars, and a shop building capable of handling 500 cars. It is planned to construct these buildings this summer so that they will be ready for use by Sept. 1, at about which time 100 new safety cars are expected to be delivered from the manufacturers.

United Railways, St. Louis, Mo.—Contracts will be let in the next few weeks for a new substation and car house for the United Railways to take the place of an obsolete station on the North Side. The new buildings will cost approximately $250,000. The management is completing the installation of two small automatic substations on St. Louis county lines, one a Westinghouse and the other a General Electric of 300 kw. capacity each. For the conversion of additional power needed on city lines four or five additional automatic stations aggregating 8,000 kw. capacity will be installed the latter part of the year, according to the plans of Col. A. T. Perkins, manager for the receiver. The two small stations, which cost approximately $26,000 each, will be in service in a few weeks.

Professional Note

Ford, Bacon & Davis announce the opening of a Philadelphia office in the Morris Building, 1421 Chestnut Street. H. V. Coes will act as manager.

Trade Notes

Dahlstrom Metallic Door Company, Jamestown, N. J., has moved its New York City office from the Consolidated Gas Building, to suite 832, Cunard Building, 25 Brodway. The company reports business generally good throughout the country, but especially in the New York and Atlantic Coast district.

The Rome Wire Company, Rome, N. Y., has opened district offices at 50 Church Street, New York City, in line with the company's expansion of manufacturing facilities at Rome and at Buffalo, N. Y. The new office will be in charge of R. S. Hammond who has represented the company in the eastern territory during the last twenty years.

Raymond Roth has located at 30 Church Street, New York City, where he has opened a district sales engineering office, covering the central Atlantic district, representing Schweitzer & Conrad on switching and protection equipment, the G. & W. Electric Specialty Company for distribution specialties, the Hopewell Insulation & Manufacturing Company, and the MacGillis & Gibbs Company on cedar posts, poles and ties.

E. Jacobus. Orange N. J. announces that after the introduction of the Jacobus vacuum lightning arresters on railroads of the United States it has been decided to prosecute the sale of this apparatus most extensively throughout the United States and Canada. Consequently the entire sale has been placed in the hands of the Multiple Electric Products Company, Inc., 450 Fourth Avenue. New York City, manufacturer of "Atlas" multiple fuses, through the offices and sales organization of which both this country and Canada will be covered.

"Ingeniería Internacional" Issues New Foreign Trade Bulletin.—*Ingeniería Internacional*, published by the McGraw-Hill Company, Inc., at Tenth Avenue and Thirty-sixth Street, New York, has issued Volume 1, Number 1, of "International Engineering," a foreign trade bulletin. Printed in English, its function and purpose are to show how American manufacturers may cement sound economic and commercial relations with the great potential market in the Spanish-reading countries and to explain and interpret the work of *Ingeniería Internacional* in forwarding these purposes.

New Advertising Literature

Electric Hoists. — The Allis - Chalmers Manufacturing Company, Milwaukee, has issued bulletin No. 1819, covering its electric hoists.

Controllers. — General Electric Company, Schenectady, N. Y., has issued bulletin No. 44678-A describing the various kinds of drum-type controllers for railway service.

Switch Box.—The Multiple Electric Products Company, 450 Fourth Avenue, New York City, has developed a switch box for lighting circuits where exposed molding or conduit wiring is employed.

Excavators.—The new P. & H. shovel attachment for use with P. & H. types 205 and 206 excavator cranes is described in Pamphlet SX just published by the Pawling & Harnischfeger Company, Milwaukee.

Oil Circuit Breaker—Type F-10 oil circuit breaker, with an interrupting capacity of 10,000 amp. per phase at 15,000 volts, has been put on the market by the Condit Electrical Manufacturing Company, South Boston 27, Mass.

Power Plant Piping. — The M. W. Kellogg Company, 90 West Street, New York City, has issued a 130-page illustrated catalog on power plant piping, embodying numerous tables.

Oil Circuit Breaker.—The Condit Electrical Manufacturing Company, South Boston 27, Mass., has placed on the market its type D-17 oil circuit breaker with resiliently suspended tanks in single units up to 1,200 amp. at 15,000 volts and up to 800 amp. at 25,000 volts.

Steel Sheet Piling.—Lackawana Steel Company, Buffalo, N. Y., has issued bulletin No. 109, containing 171 pages describing steel sheet piling.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

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More Business in Government, Less Government in Business

THIS idea, which was adopted as a text by the United States Chamber of Commerce at its meeting last month, seems also to be the guiding policy of the present national administration. A desire to secure help from industry in the work it has to do and to undertake by government action nothing which can be carried on more effectively by private initiative has already been expressed by the Secretary of Commerce. Another significant declaration bearing upon the same matter was contained in addresses made at a banquet in New York last week in honor of the founding of the New York *Commercial*, attended by the President and the Secretaries of War, Commerce and the Interior. The occasion, the 125th anniversary of the founding of an important business paper, was an appropriate one in which to outline the essential correlation between business prosperity and national prosperity. This thought was voiced by the President, who held that the business man should not be prejudged as a criminal, but recognized as an important factor in national prosperity. The close connection of the business press with industry was also recognized in the address of the President, as well as in that of Mr. Hoover. This position on the part of the national government is most encouraging, especially at the present time when there is so much unemployment and stagnation in business. With such a sentiment, there should be a revival of industry.

Get the Young Engineer While the Getting Is Good

ELSEWHERE in this issue is a graphic portrayal of the value of a capable man in charge of rolling stock. If similar data for other departments of a railway could be portrayed as graphically, the results would doubtless be just as striking. Such men are of inestimable worth to a company, and more young men of the necessary ability should be in training as future master mechanics, superintendents of equipment, transportation engineers, power or track engineers, superintendents and general managers.

This month the engineering schools of the country send forth a large number of potential civil, electrical and mechanical engineers—young men with good fundamental training and most of them with plenty of ambition and energy. Some of these future leaders should be encouraged to come to the electric railways, where every one knows they can find plenty to do. The trouble is—the reason they do not come is—first, that no one goes after them; there is no organized and very little individual effort to induce young men to come to electric railways, and, second, that when they do come it is in only a few cases that the railway actually makes it worth while, opens up the right opportunities to them.

Not that they should start at the top! By all means the opposite should be the case. But the opportunities ahead should be made clear and the positions which they may ultimately attain made sufficiently attractive as to financial status and responsibility.

The continued development of organized methods to absorb young engineers into other engineering industries should be sufficient indication of the value of such effort. The electric railway has been slow in this line. But the present is a good time to change. There is a new crop of young engineers. Some of the industries which usually absorb many from the annual production are operating on a restricted basis and will not take the usual number this year. Electric railways can normally use more men in summer time. Why not make a study to see where young engineers could be used to advantage and get them now that the getting is good?

Jitneys Regulated in Their Last Strongholds

LOCAL legislation in Kansas City, Mo., and state legislation in New Jersey and Connecticut give prospect of doing much to bring jitney competition within reasonable bounds in these places. The quarrel of the railways with the jitneys has never been with these vehicles as such, but with them on the score of their unreasoning and unreasonable competition on anything like a comparable basis. The jitneys have continued in use in the places mentioned long after similar vehicles were banished elsewhere, from a combination of circumstances, but mostly because of political chicanery. In Kansas City they have now been relegated to operation on streets where there are no railways, while in both New Jersey and Connecticut prospective operators of the jitneys must obtain from the local state commission a certificate of convenience and necessity before being permitted to operate. In neither of the states mentioned has the new law yet begun to function, so no precedents have been established as to the attitude of the local bodies with respect to regulation, but the commissions have set to work to organize the machinery therefor. In Connecticut, for instance, the commission has called upon the local governing authorities to indicate routes for the jitneys, thus preserving a measure of home rule.

In Kansas City the lessons of the benefits of the new legislation are fast being driven home. The receivers of the Kansas City Railways, true to their promise, have placed about 10 per cent more cars in operation. This service would have been provided before except that under jitney competition there was not enough traffic to pay for keeping the cars on the streets. These additional cars have had a salutary effect, with the result that in the month of operation under the ordinance the public view has changed to a marked extent. The bitter enders will of course stick to the jitney to the end. That is their prerogative. But the real place of the jitney as a service supplementary to the trolley instead of being competitive with it appears now to have been firmly established in the public mind in Kansas City.

From "Interurban" to "Electric Railroad"

REFERENCE is often made to the name "interurban" as being an onus—a word too easily made over in common parlance into "inter-ruben" and carrying a meaning not altogether complimentary. Some have suggested that an effort be made to rename the interurbans "electric railroads," on the supposition that this would lift them to a higher plane of public esteem. This may help, but cannot alone do the trick, for an interurban by any other name would still be subject to criticism—if criticism was deserved. But there is one way in which the desired end may be attained, and that is by such improvements in cars, roadbed and service as will earn for the property the reputation of being a real railroad.

An evolution of this kind has been witnessed on the Chicago-Milwaukee line operated by Britton I. Budd, whose effort has been persistently directed toward making the service of this road comparable with the high-grade steam road service with which he competes. He has very nearly attained that goal, with the result that the traffic handled has increased enormously, and the remark is now frequently heard, "It's a real railroad." The word "interurban" doesn't seem to apply any more. At one time, like many other electric lines, it was better characterized as an extended street car line, but it has won the more desired term of railroad because it is one. A similar evolution is now well under way on the Indianapolis-Louisville line under the direction of Harry Reid, and the policy being pursued promises to bring much new business and win for it the favorable public attitude sought. Some of the improvements made and in the making on this line are reviewed elsewhere in this issue. Without such actual physical evolution in an interurban property there can be little accomplished by an effort merely to change the term of reference.

Repair Versus Replacement in the Rolling Stock Department

ONE effect of the erstwhile "hard-up" condition of the electric railways has been a campaign of rolling stock rehabilitation. Superannuated bodies and trucks have been scrutinized to determine whether a year or two more of service could be squeezed from them. Cars which were awaiting only financial amortization before destruction have been furbished up and recommissioned. In ordinary times the economy of much of this work would be questionable. In the hard times which have recently been passed through economics gave way for the time to bitter necessity. This was marking time, as was pointed out editorially in the May 21 issue of this paper, but marking time has its place in transportation as well as military practice provided it is not continued too long. Marking time produces no speed toward progress, it simply keeps the army in step, or, in electrical phraseology, in synchronism.

There will always be an excuse or a reason for revamping some rolling stock, particularly to adapt it to changed transportation requirements. But the wholesale continuation of this practice will soon cease. In other words the era of repair will give place to the era of replacement. The former has, however, brought out clearly the excellent qualities of much of the work of the builders of many years ago. Thus, in last week's issue was an article telling of work done by the New York State Railways on some motor cars and trailers. The cars of one batch were originally open bench summer cars. These were made over into closed motor cars some years ago and have now been remade over into center-entrance trailers. The fact that they would stand all of this, even allowing for the reinforcing which necessarily accompanied the remodeling, shows that they originally had good stuff in them, well fabricated and finished.

Fare Changes and Conductors' Morale

CONDITIONS on a certain railway which will be unnamed prove again that when a change in fare becomes necessary, failure to adopt a system that commends itself as just to the average layman is as bad for platform morale as it is for public relations. On this particular property the change in fare was an increase and the line was divided into equal-length fare zones, while the line itself operates in and between several practically contiguous cities. To cross the dividing line means the payment of a second fare whether the passenger boards the car ½ mile or 3 miles back or whether he is riding another fraction of a mile or several miles more. To make the matter worse several of the zone limits occur at points where there is naturally considerable short distance riding from one side to the other of the selected zone line. The obvious result has been the dissatisfaction of a great many riders who are expected to pay double fare for a distance that may be less than many people obtain for a single fare. Of course, the grumblers vent their grievances on the company representative nearest at hand—the unhappy conductor. Day in and day out he is greeted with such ire-provoking expressions as: "What kind of a railway is this, anyway?" "Why didn't you yell out that it meant another fare to ride another block?" and so on to the point of fisticuffs.

Such conditions as this mean something more than loss of traffic. They are sure disrupters of the conductor's morale and of his confidence in the management. Neither efficient fare collection nor enthusiastic ride selling is to be expected when the company has adopted—or some commission has compelled it to adopt—what looks like the easiest way of devising a multi-fare system. Would it not have been better to have a system of zones that would seem a little more logical to the car rider, *i.e.*, with zone points at natural traffic division points? It is not necessary that the zones should be of equal length provided the average rates per mile do not differ greatly and the total fare for the entire ride is reasonable. Such a plan would permit the zone limits to be placed at points where the greatest number of car riders would not be asked to pay an extra 6 cents or 10 cents for a ride of a few blocks and would largely do away with any considerable agitation for overlaps or lower fares.

On the selection of its zone points a company can usually get good advice from its conductors. They are the ones brought into closest contact with the company's customers, and they know the way in which any fare plan is likely to be regarded by those who pay fares. In fact it is a good rule in any kind of business that a merchant must convince his salesmen that the goods they have to sell are worth the price and that the sales conditions are fair before he can be very successful in bringing the customer to this belief. This rule should apply in electric railroading.

Blighted Districts and City Planning

AMONG the interesting features of the report made by the St. Louis Planning Commission on a transit system—present and future—for that city is the discussion on blighted districts, or those areas of low assessed values which exist in most cities between the business district and the more popular residential districts. From many standpoints it would seem most desirable if the blight on these districts could be removed. To the municipality they mean sections of the city from which the tax yield must be low; to the electric railway they mean the operation through them of relatively unprofitable car-miles to carry the passengers to and from the outer districts, while to the property owner these deteriorated districts obviously represent a direct monetary loss. With regard to such areas in St. Louis, Harland Bartholomew, engineer of the commission, says.

"Hauls of 5 or 6 miles are not the exception but more nearly the rule. Even the haul would not be so objectionable were it not for the fact that nearly half of it is through sections of the city which have constantly deteriorated in usefulness and from the standpoint of transit are almost entirely unremunerative."

To some people the cause of the blight which has fallen upon these ill-fated districts, lying between the business and high-class residential sections of the city, is the unit fare. If a lower fare were charged for the shorter ride to them as compared with a higher fare for the longer ride to the outer and more favored regions, they say, the salvation of these districts would be secure. The owners of the buildings then would be encouraged to tear down their old-fashioned houses and erect better structures in their place to accommodate the tenants to whom a difference of a few cents in fare per ride would be an object.

It is not well to dogmatize about such matters from appearances, but the blighting of a city district has so many possible causes that it is usually unwise to say that it is due to any single factor or that in any particular case it could be corrected by such a simple plan. It is more probable that even with a zone system the same conditions would prevail to very much the same extent and that the causes lie deeper than simply the rate of fare.

In fact, in the usual rapidly developing American city there are almost bound to be certain areas surrounding the business district which are changing in character from residential to commercial. Usually the history of these districts, or a good part of them, is about as follows: At one time they constituted a first-class residential neighborhood on the fringe of the city as it then existed. As the commercial area expanded, trade gradually pushed its insidious way in among the mansions. First perhaps came the dentist, then the apothecary's or milliner's shop was opened, to be followed by the high-grade grocery store. Gradually the more exclusive or prosperous residents moved outward and the former mansions became boarding houses, then possibly tenements. In all of these cases the trolley fare was probably not the controlling factor. The ultimate hope of such a district is not that its high-grade residential character will be revived—that is probably hopeless—but that it relatively will come nearer the business district and finally become part of it. Then the old buildings will give place to modern office structures, stores or warehouses, the assessable value will again increase and the owner will be happy.

The only effects which the development of electric railways and rapid transit systems can have on this natural condition are to hasten the change and to direct it along certain routes. This hastening may be first in the retrograde character mentioned and then in the renaissance of the property as regards value. In Brooklyn, for example, Fourth Avenue has already been improved in many spots because of the building of the subway. In fact, both offices and stores will be apt to follow along a rapid transit line, like a vine, leaving between the arteries of trade triangular areas of a residential character. Neither the owners nor the city should worry unduly about these fluctuations in real estate value. The "blighted" period is very apt to form the chrysalis stage of development, to which city real estate is subject.

Electric Railway Engineers Constitute a Large Fraternity

COMMITTEE activity in the American Electric Railway Engineering Association is now at its height. The meetings are being well attended and a fine spirit is manifest. One of the most impressive signs of efficiency in this committee work is the spirit of good fellowship that marks all of the gatherings of committeemen. This fact impresses one with the value of such meetings from the human standpoint, which in itself would justify the time and expense involved in getting together.

For the benefit of the technical development of electric railway work it is necessary that the responsible engineers be furnished ample opportunity to meet at these committee sessions and at the conventions of the Engineering Association, otherwise they are apt to be provincial and academic. The large attendance at committee meetings shows that this truism is appreciated. The helpful personal relations which are established thus are maintained between them by correspondence, chance or planned visits, the reading of "personal" items in the electric railway press, etc. There has thus been built up in the electric railway industry a national, although informal, engineering fraternity, membership in which should be highly prized. Every such opportunity should be embraced to foster the spirit of brotherhood' that the electric railway engineer is privileged to enjoy.

Quotation from the Federal Electric Railways Commission Report

No. 23

GENERALLY speaking, this (introduction of economics of operation) can be done by the elimination of deadheads and other free service, the abandonment of non-profitable lines and, where practicable, the substitution of one-man cars for heavier equipment, the modification of special taxes or provisions for paving, snow removal, street closing, tolls, contributions toward the cost of public highways, bridges, etc., reduction of such rentals and power rates as may on investigation prove excessive, the co-operation with the public in developing faster schedules and installing skip stops at convenient places, rerouting of cars, the use of trail cars, keeping street car tracks clear of traffic and other congestion, due to parking of motor cars on curbs, and the regulation of vehicular traffic.

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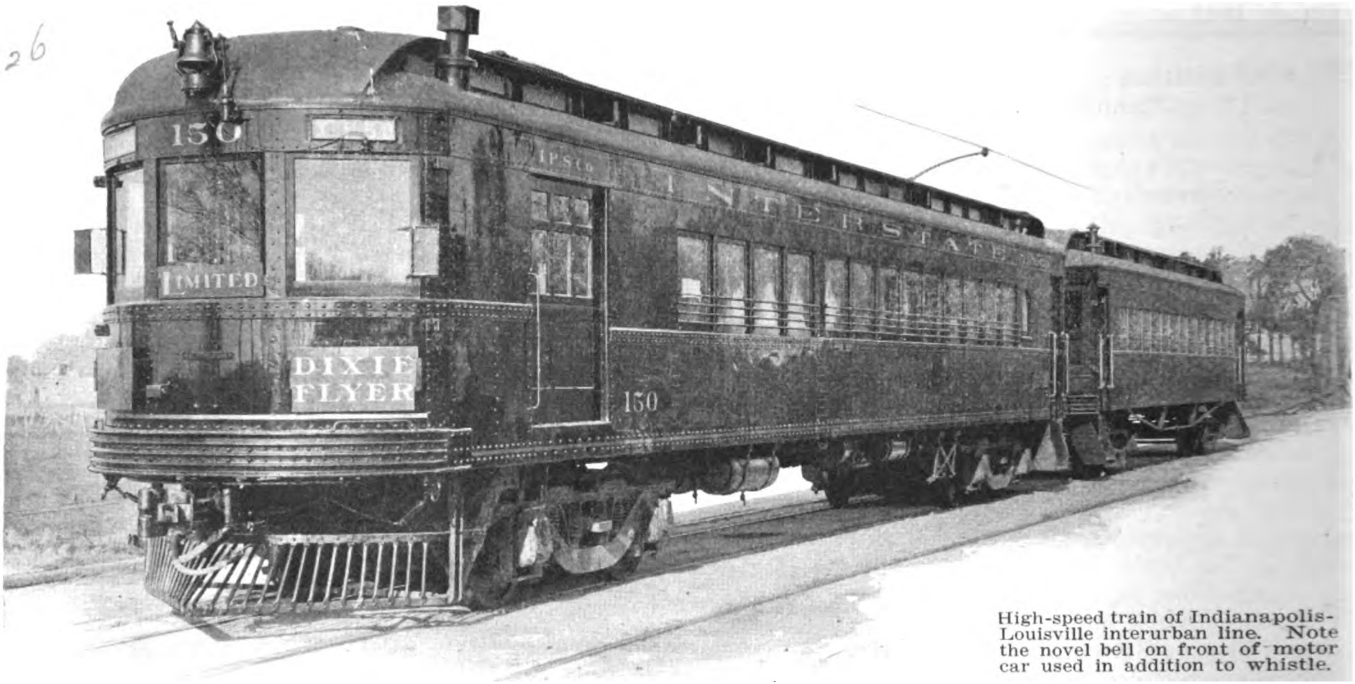

High-speed train of Indianapolis-Louisville interurban line. Note the novel bell on front of motor car used in addition to whistle.

Developing an Electric Railroad

Indianapolis-Louisville Interurban Is Undergoing Extensive Rehabilitation and Improvement—Features of New Steel Motor Cars and Rebuilt Trailers for Use in High-Speed Limited Service Are Described—Other Improvements to Be Related in Articles to Follow

NOTWITHSTANDING high prices and other adverse economic conditions, the Interstate Public Service Company, Indianapolis, Ind., under the direction of Harry Reid, president, has been extensively improving its 117-mile Indianapolis-Louisville interurban property and service during the past two years. The betterment work has followed along a plan designed to develop a railroad capable of rendering a high character of passenger and freight service between these two important terminal cities. While all details of the plan have not yet been fully realized, the physical improvements already accomplished, coupled with the evident disposition of the operating officials to give the public the kind of service it wants, have had a marked effect in attracting patronage to the road. This is reflected in the accompanying tables showing the recent growth in freight and passenger traffic.

The major betterments already carried out include the purchase of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company and the merger of them with the Interstate company; the purchase of new motor cars, the building of trailers and the inauguration of a new faster through limited service between Indianapolis and Louisville; the purchase of locomotives and new freight box cars and the inauguration of new through over-night freight service; the change-over of the 62-mile mid-section of the road from 1,200 volts to 600 volts to conform to the remainder of the system; abandonment of old 25-cycle transforming equipment and the installation of new 60-cycle substation equipment; the reconstruction of the old transmission line for higher voltage, the building of 54 miles of new transmission line and the dismantling of two obsolete power houses with arrangements for purchase of power, and a large amount of work on overhead and distribution systems and on the track and roadbed. Among the further improvements planned for the immediate future are the building of new shops, on which work has recently begun; the probable purchase of necessary equipment and inauguration of a parlor car and dining car service with possible sleeping car service; the installation of further automatic substation equipment, etc.

Perhaps of greatest interest at the moment are the

PASSENGER EARNINGS, INTERSTATE PUBLIC SERVICE COMPANY AND INDIANAPOLIS & LOUISVILLE TRACTION RAILWAY

	1919	1920	1921
January	$89,585.70	$116,207.21	$131,814.43
February	84,807.51	111,489.29	119,405.38
March	95,465.18	124,092.35	136,289.42
April	94,785.72	127,294.56	....
May	104,089.51	134,507.01	....
June	101,370.90	128,922.31	....
July	116,066.87	141,092.27	....
August	136,278.37	149,082.99	....
September	130,318.67	146,569.34	....
October	125,267.12	139,529.14	....
November	120,003.21	132,008.51	....
December	121,362.82	138,512.29	....

The operation of the Indianapolis & Louisville Traction Railway was taken over by the Interstate company in July, 1919. These figures include the entire line, Indianapolis to Louisville, Ky.

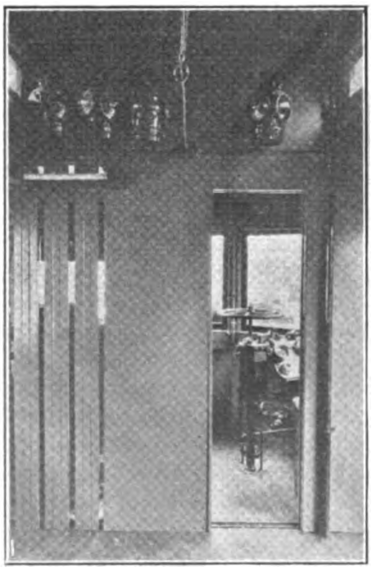
FREIGHT EARNINGS, INTERSTATE PUBLIC SERVICE COMPANY AND INDIANAPOLIS & LOUISVILLE TRACTION RAILWAY

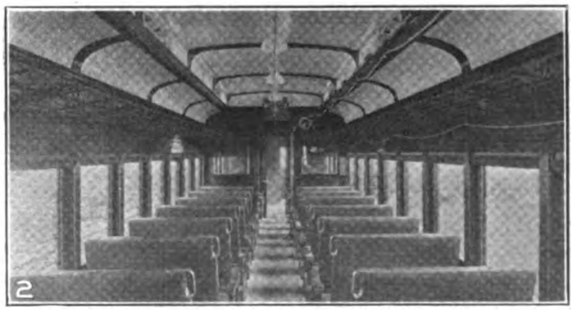
	1919	1920	1921
January	$7,029.47	$13,349.00	$14,378.70
February	7,406.60	15,617.19	16,146.92
March	9,235.31	20,362.71	21,024.46
April	....	22,275.37	....
May	10,203.83	23,127.48	....
June	12,159.24	28,886.62	....
July	12,428.94	23,949.87	....
August	17,031.42	21,571.49	....
September	19,088.46	27,598.62	....
October	17,666.28	24,800.50	....
November	14,741.09	20,556.98	....
December	12,395.49	16,085.10	....

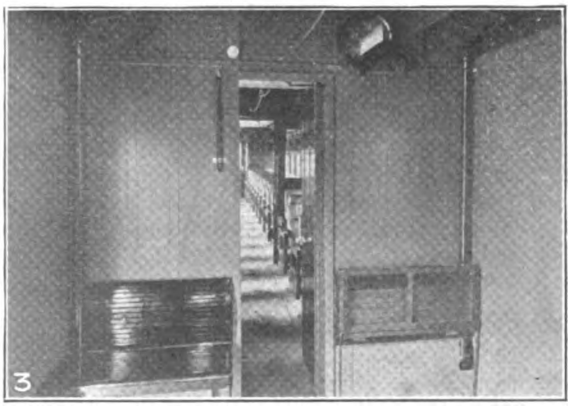
The operation of the Indianapolis & Louisville Traction Railway was taken over by the Interstate company in July, 1919. These figures include the entire line, Indianapolis to Louisville, Ky.

new rolling stock and the plans of the equipment department for a new shop at Scottsburg, Ind. In the last two years the rolling stock purchases have included twenty new box cars, a 37½-ton and a 25-ton locomotive and eight new steel passenger cars. Because of the great amount of time and design talent applied, these passenger cars are of particular interest. They are quite fully pictured in the accompanying views.

In general, these cars are of steel construction with a composite superstructure and monitor deck roof, with the interior arranged in passenger, smoker and baggage compartments. They are 62 ft. long over bumpers, seat sixty passengers and weigh 95,500 lb. They are equipped with special Baldwin trucks, having 7-ft. wheelbases and placed at 39-ft. centers. These trucks are equipped with 36-in. rolled steel wheels and 5-in. x 9-in. journals and Stucki self-centering and positive-rolling side bearings. The body side bearing is made with a removable wearing plate. The spring design on the trucks is such as to preserve good riding qualities through a wide range of live load. This is obtained by the use of an auxiliary set of bolster springs which do not come into bearing until the load has exceeded a certain amount, a feature developed for the last cars bought by the Chicago, North Shore & Milwaukee Railroad. Adequate spring support for a heavy load is thus secured without making the car ride stiff under light load conditions.







THESE VIEWS ARE OF THE INTERIOR OF THE MOTOR CAR

No. 1—Motorman's cab partition showing open construction and heater location.

No. 2—Looking forward from rear of main passenger compartment showing interior finish—aisle mats not in place.

No. 3—Rear of baggage compartment showing folding seats, city fare register location, etc.

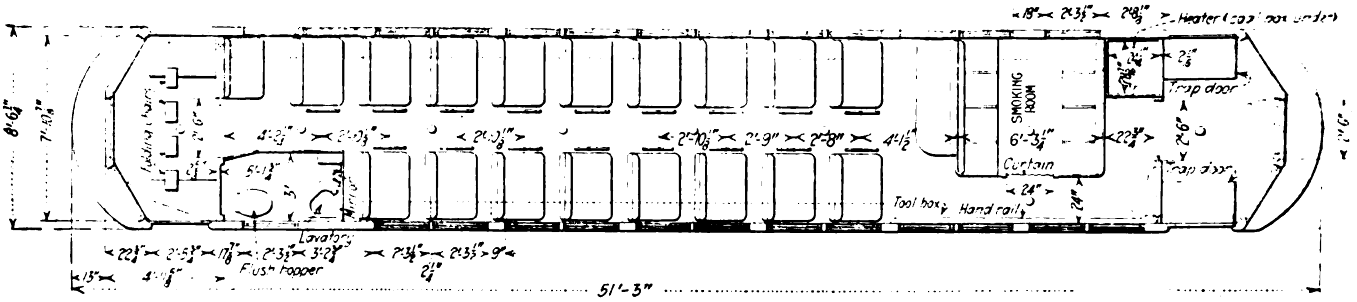
No. 4—Convenient mounting of instruments and controls in operating cab.

The further major equipment of these cars comprises four G.E.-254, 150-hp. motors with automatic field tap control and General Electric type PC multiple-unit control arranged for single-end operation. Westinghouse 38-ft. type D-3-EG compressor and type J governor are used. The couplers are of the Tomlinson MCB radial type, conforming with the C.E.R.A. standard.

The main support of the steel underframe is derived from the two side sills and two center sills. The side sills consist of 5-in. 6½-lb. channels extending from the buffer beam at the front end to the corner post at the rear end. The center sills consist of two 7-in. 15-lb. I-beams extending from front to rear buffer and reinforced with continuous pressed-steel section ⅜ in. thick extending from back of the bolsters to near the ends. Certain features of the underframe and vestibule steel work provide an anti-telescoping construction. The bolsters are of the built-up type consisting of plates and rolled sections which are fastened to the center and side sills.

The floor beams consist of 5-in. 6½-lb. channels extending from side sill to side sill and riveted to the horizontal flange of the side sills and to the side posts. The end sills consist of 6-in. 8-lb. channels supplied with 12-in. x ¼-in. top and bottom cover plates extending from side sill to side sill. No diagonal bracing was provided in the underframe, except for those braces in the platform construction which extend from each corner of the platform to the near center sill. The entire underframe is covered over with steel plates which tie all the members together, giving a certain amount of diagonal bracing and serving to fireproof the floor from the equipment. The buffers were made from 10-in. 15-lb. channels applied with the flanges outward and bent so that the radius of the outside flange is 5 ft. A 5½-in. Rico heavy-weight anti-climber section extending the full width of the car was secured to the web of these buffer-beam channels.

The side sheets, consisting of No. 12 gage steel and extending from the bottom of the side sills to the belt rail, with No. 14 gage steel above, are riveted to sill, belt rail and posts. This side-sheet construction is strengthened by a 4-in. x ½-in. bar riveted to the side sheet and extending from one end of the car to the other to form the belt rail. There is also the further



FLOOR PLAN OF NEW INTERSTATE PASSENGER CARS

strengthening afforded by a 3-in. x 3-in. x ¼-in. angle extending from end to end of the car body.

The side posts are made up of 3-in. x 2-in. x ¼-in. Tees sandwiched in between two sections of oak posts and covered with two pressed steel sections and a cover plate riveted over the joint, giving the appearance of a metal post. Each post is welded to the belt rail and side sill. Every third carline is of T-iron and wood composite construction, while the two intervening carlines are of wood.

The interior of the car is finished in cherry, stained mahogany, and the Agasote head lining is painted white, giving a pleasing and bright interior appearance. Center lighting is supplied by two circuits of 94-watt lamps. The fabrikoid covered seats were furnished by Heywood Brothers & Wakefield Company, New York. The bell cord is carried through the center of the car in anti-swinging hangers.

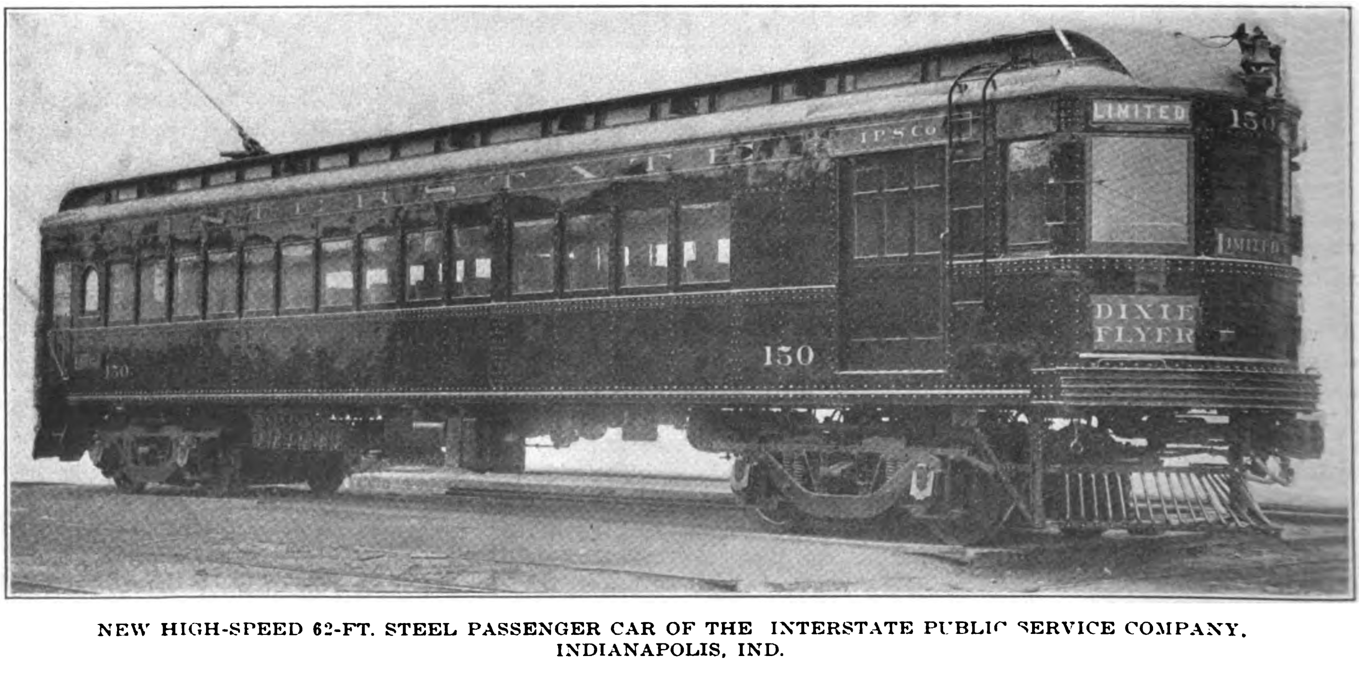
MONITOR DECK ROOF DESIGN USED

After a study on the part of H. H. Buckman, master mechanic, the monitor-deck type of roof construction was decided upon because of the superior ventilating properties claimed for it. Ventilation is afforded by twelve deck-sash automatic ventilators supplied by the Automatic Ventilator Company and located two in the baggage compartment, four in the smoking compartment, five in the main passenger compartment and one in the toilet.

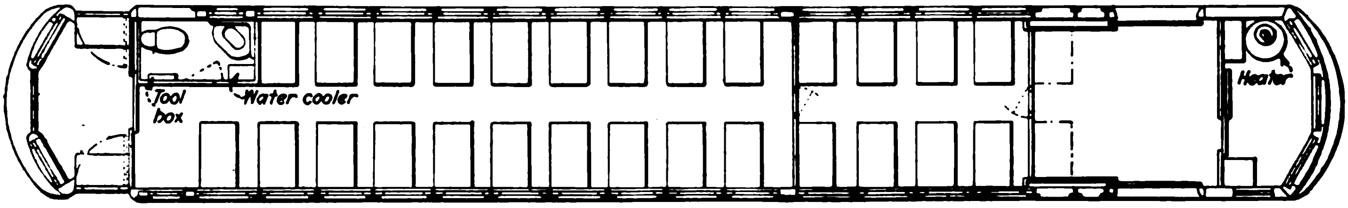
The rear vestibule is arranged with a door on either side and equipped with trapdoors so that the vestibule may be closed up tight. The platform is reached by mounting four steps of heights from rail to car floor of 16 in., 12 in., 12 in. and 12 in. The rear vestibule is also equipped with a train door, as it is the plan to use these new cars in limited service and haul trailers. No train door is provided at the front end, however.

The toilet is located just inside the rear vestibule and is equipped with a water-flushing bowl, wash basin, mirror, etc. The tool box is mounted on the inner partition and the water cooler is inset in the forward corner of the toilet. A 25-gal. tank for carrying the flushing and washing water supply is located overhead in the toilet room and is filled from either side of the car by attaching an ordinary garden hose to the pipe leading from the tank to that side of the car and fitted with the male end of a standard garden-hose connection. When the tank is filled through one of these pipes, the other acts as an overflow, and as these two pipes enter the tank at the top, no valve is necessary in either.

Through the use of the Peter Smith hot-water heater in the motorman's cab the full capacity of the baggage compartment is available for handling baggage and express shipments. Two folding sheets attached to the partition between the baggage compartment and the smoking compartment are available for use of passengers when the car is heavily loaded and there is room in the former. The motorman's cab is separated from the baggage compartment by a partition made of pressed steel sections with wood fillers, designed to protect the motorman from being crushed by the heavy



NEW HIGH-SPEED 62-FT. STEEL PASSENGER CAR OF THE INTERSTATE PUBLIC SERVICE COMPANY, INDIANAPOLIS, IND.



FLOOR PLAN OF INTERSTATE TRAILER USED ON LIMITED TRAINS

baggage coming forward in case of collision. This partition was built with 1¼-in. openings between the pressed-steel sections in order to let out the radiated heat from the stove and thus prevent the motorman's cab from being uncomfortably warm. The first three openings adjacent to the door, however, were covered with a plate to prevent any one from getting his fingers jammed when the sliding door is opened. An accompanying picture shows the construction of this partition and also the provision made for carrying the train signal lamps and flags.

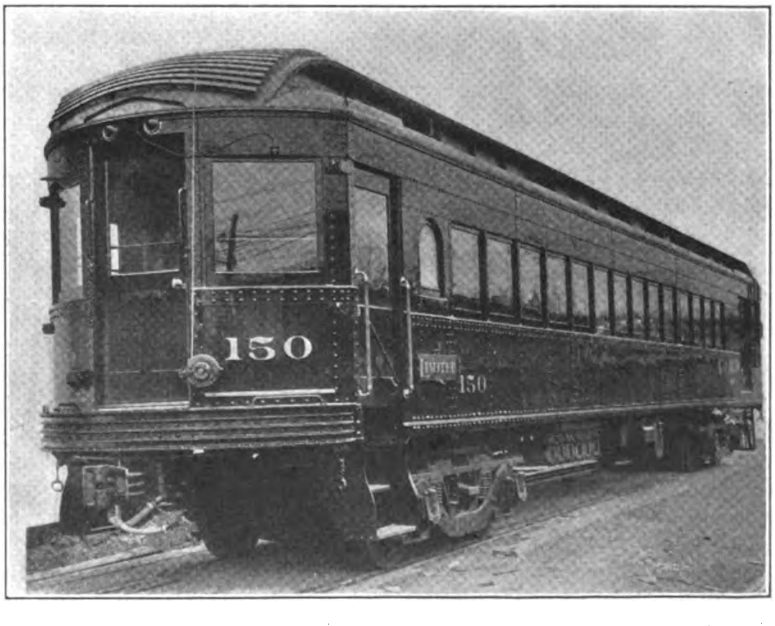
The arrangement of the motorman's cab is particularly interesting. The controller and brake valve are located for convenient operation from a sitting posture on a built-up seat adjacent to the window at the right side of the cab. Between the door and air valve is an instrument board on which is mounted an ammeter, the air gage and between these an order clip or holder, a snap-switch controlling the headlight, a push button for signaling the conductor as a check upon orders when approaching each siding, and a push-button switch connected with a small light which illuminates the train order when in place on the board. Just above the board are two small levers operating air valves, one of which operates the sander and the other a locomotive bell. The whistle valve is located overhead in the front corner of the cab and a cord from it hangs down at a convenient point for the motorman. Both the bell and sander valves are of the Viloco throttle type. The hand brake staff is located in front of the control mechanism and given an upper support and bearing on the triangular steel frame attached to the dash and supporting the control board and other mechanism. This hand brake is equipped with a large wheel and arranged for 100 per cent braking. A Drew mirror was installed on each front corner post wherein, from a sitting position, the motorman can look through the side cab windows into the mirror and watch the rear end. The Interstate motormen have found the two mirrors to be very helpful as a means of watching to see if the rear trucks split switches when negotiating city track special work, in addition to the usual use for observing passenger movements. By watching in the left or right mirror, depending on which way the rear trucks would go if the switch were split, the motorman will note immediately any sudden swing of the body or see the corner of the truck swing out and stop the car in time to avoid damage.

Located on the inside of the motorman's cab partition is the switch cabinet for controlling various car circuits. The telephone used in communicating with the dispatcher from points along the line is mounted on this same partition beside the switch cabinet, and a small writing desk on which to write orders is located just below the cabinet. There is also a rack on which extra jumpers, air hose, coupling pins, sleet cutter, shackle bar, etc., are carried. A light was installed in the switch cabinet and a hole cut in the top and bottom. The bottom hole permits light to shine on the desk where orders are written, and the upper hole on the heater gage. A ½-in. thick rubber mat is provided on which the trainmen can stand when using the telephone as protection against static shock.

LOCOMOTIVE BELL AN EXCELLENT ADVERTISEMENT

One of the unique features of these cars is their equipment with an air-operated locomotive bell to serve as a warning alarm in addition to the whistle and foot bell. It is a No. 602 Baldwin Locomotive bell which has a tone somewhat higher than commonly used on steam roads. The sound of this bell is claimed to carry better than the whistle, particularly under fog and high wind conditions. It is used at particularly bad crossings and while passing through the smaller towns, or anywhere that it is desirable to sound a warning continuously or repeatedly. The motormen are instructed to use the whistle as they have always done and to use the bell for an additional alarm. One consideration in this connection was that it is considerably cheaper to operate the bell than it is to blow the whistle repeatedly. The bell consumes 0.7 cu.ft. of air per minute while the whistle consumes 40 cu.ft. per minute. The officials of the railroad have also found that the novelty of the bell has been an excellent advertisement for the cars of the Interstate company. Furthermore, the traffic police of Indianapolis have encouraged the motormen to sound this bell at the main intersections where they are stationed, as it is very effective in helping them clear the streets.

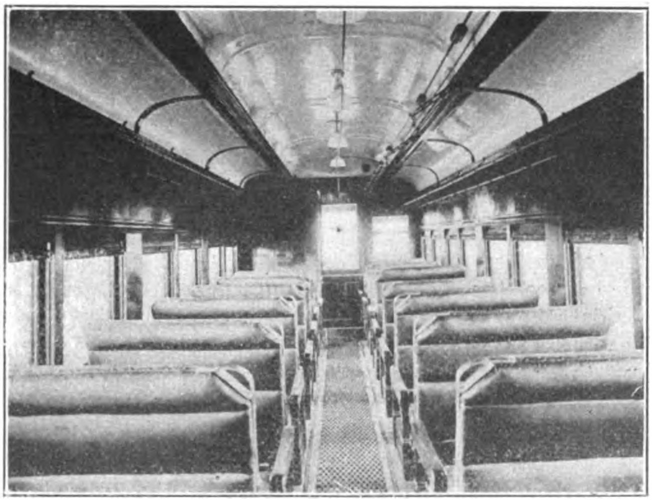
Particular pride is taken by the designer and builder of these cars in the distribution of the various equip-



REAR OF STEEL MOTOR CAR, SHOWING END CONSTRUCTION ment underneath the car. This has been accomplished in a way which has not only given an exceptionally even weight distribution but has left every piece of apparatus accessible. These new passenger cars were built by the Cincinnati Car Company.

REBUILT CARS FOR TRAILERS

As it was planned to use trailers with the new motor cars in the fast limited service between Indianapolis and Louisville, the Interstate Company is planning to provide the trailers by rebuilding old motor passenger cars, one of which has been completed and placed in service thus far. This rebuilding work was done by the American Car & Foundry Company, Jeffersonville, Ind. While of wood construction, the trailer was given the appearance of a steel car by putting steel plates on the sides. The underframe was strengthened by using pressed-steel sections to reinforce the I-beams and channels. The ends were rebuilt to conform to the same radius as that of the motor car and reinforced with anti-telescoping construction similar to that used on the motor cars and anti-climbers. Both vestibules were inclosed, and while arranged for double-end operation, the vestibules were so built as to be used for an observation platform at the rear of the car. The end windows were glazed with ¼-in. polished glass which was brought down to within 12 in. of the floor. Four standard Pullman folding chairs are placed in this rear vestibule, and these are removed to the opposite end, if for any purpose the direction of running the car is reversed. An advantage of closing up the rear vestibule and using it for an observation platform is that it automatically blocks entrance and exit at this end and forces the ingress and egress of passengers at the forward end, so that when the trailer conductor is back throwing a switch or protecting the train, the conductor on the forward car can watch both the motor car and trailer entrances.



INTERIOR OF REBUILT TRAILER WAS FINISHED IN PLEASING WAY

The trucks used are old Peckham design with 6-ft. 4-in. wheelbase equipped with new springs and having good riding qualities. The old Gothic sash were removed and double letter boards installed. The car was also equipped with permanent storm sash. A smoking compartment was arranged for the trailer by building in a compartment at one end in a manner similar to that employed on some Pullman cars. This is equipped with two long cross seats which will seat eight passengers. The room is curtained off from the side aisle leading from the vestibule around to the main passenger section. A toilet equipped very much like that of the motor car was installed at the end of the car body opposite from this smoking room. The floor plan and various dimensions of this car may be seen in an accompanying drawing. The trailer is 51 ft. 3 in. long over buffers, weighs 54,000 lb. and has a seating capacity, including the four chairs on the observation platform, of fifty-one.

DATA COVERING NEW PASSENGER CARS

Length over buffers	62 ft.	0 in.
Length over dash	60 ft.	6 in.
Height rail to top of roof	13 ft.	1 in.
Extreme width	9 ft.	2¼ in.
Width of seats		38 in.
Width of aisle		28½ in.
Rail to bottom of sill		43 in.
Length of rear platform	6 ft.	4 in.
Weight		95,500 lb.
Seating capacity		60
Post centers	2 ft.	8⅞ in.
Length of baggage room	8 ft.	3 in.
Truck centers (approximate)	39 ft.	0 in.
Wheelbase	7 ft.	3 in.
Size of wheels		36 in.
Baggage door opening	3 ft.	10⅞ in.
Bulkhead door openings	2 ft.	4 in.
Rear door opening	2 ft.	5 in.

The hot-water heater is very neatly and compactly installed at the end of the car between the smoking room and the bulkhead and inclosed in a cabinet so that it is entirely out of the way and, consequently, unobserved.

The interior finish of the car is practically identical with that of the motor car, including the mahogany finish, white headlining, Wakefield fabrikoid covered seats, central lighting with two circuits of 94-watt lamps, etc.

The trailer and motor car are equipped with a Faraday signal system which is arranged in such a way that any conductor can send and receive a signal at the same time. Thus, if a rear conductor gives a stop signal while the forward conductor is passing up a go-ahead signal, the latter will get the signal from behind simultaneously and will be able to reverse the signal he may be giving. This is all worked out so that there is only a single wire between cars. The bell cord on one car rings the buzzer on the car ahead. The motorman's signal on the motor car is a single-stroke bell.

THROUGH PASSENGER SERVICE OF THE INTERSTATE

Through trains have been operated between Indianapolis and Louisville since 1908, this service requiring until recently the use of cars equipped for both 600 and 1,200-volt operation. For some time back six limited trains each way each day, making the trip in four hours, have been run. With the difficulties of two different voltages eliminated and the new cars in service, it is expected that this service will soon be replaced by seven limited trains a day each way, and that the run will be made in three and one-half hours. The shortening of the running time will be made as rapidly as track and power conditions permit. At present limited trains leave Indianapolis for Louisville at 7, 9, 12, 2, 4 and 7 o'clock each day. Northbound, trains leave Louisville at 7:30, 9:30, 11:30, 1:30, 4:30 and 6:30 o'clock every day. Southbound the trains are called "Dixie Fliers" and northbound "Hoosier Fliers."

When the new cars were installed Mr. Reid invited a party of prominent business men and city officials from Louisville to be the guests of the company for a trip to Indianapolis and return on one of the new cars. A week later a similar party of Indianapolis business men and officials was taken to Louisville and return. In addition to the special attention which these parties called to the Interstate company through the public press, the new cars have otherwise been the source of a great deal of very favorable advertising for the company and have undoubtedly attracted patronage to the road. The company also capitalized on the installation of the new cars for some good purchased advertising, though so much news matter about them appeared in the newspapers that not a great deal of purchased space was necessary to inform the public of the improvement which had taken place.

In two following issues will appear descriptions of the new freight equipment placed in service by the Interstate, the new shop layout, the changes in the power system and the new substations, the freight service and nature of business handled and other points of interest in connection with the making of a railroad out of the interurban lines between Indianapolis and Louisville.

Southwestern Association Meets

Publicity and Public Relations Formed an Important Part of the Program of the Annual Convention at Galveston on May 18-21

THE seventeenth annual convention of the Southwestern Electrical and Gas Association was held at Galveston, Tex., May 18, 19, 20 and 21, with somewhat more than 250 delegates present. A. Hardgrave of Dallas, president, presided during the convention, and H. S. Cooper, secretary of the association, occupied the secretary's desk.

At the closing business session Saturday C. E. Calder, vice-president of the Dallas (Tex.) Railway and other Strickland interests in north Texas, was elected president; Alba H. Warren, vice-president and general manager of the El Paso (Tex.) Electric Company and former general manager of the Galveston Electric Company, first vice-president; S. R. Bertron, Jr., of the Houston Electric Company, second vice-president; John W. Carpenter of the Dallas Power & Light Company, third vice-president; J. M. Dickey, Galveston, treasurer. The executive committee will choose a secretary, and it is assured that H. S. Cooper will be retained in this position. This committee will also select a meeting place for next year and fix the time for such meeting.

News of the death of Col. J. F. Strickland of Dallas, president of the Texas Electric Railway, the Dallas Railway and various other north Texas utilities, was received just after the convention adjourned, but the delegates still in the city were called together and adopted suitable resolutions expressing sympathy for the family of Colonel Strickland and expressing profound regret at the death of such a leader among the traction men of the country.

The convention was called to order Wednesday afternoon by President Hardgrave. Mayor-elect Charles A. Keenan extended a welcome to the delegates, and this was responded to by D. A. Hegarty, general manager of the Brush Electric Company of Galveston, on behalf of the association.

A feature of the first session was an address by Martin J. Insull of Chicago, president of the National Electric Light Association, who urged that the public utilities of Texas and of the entire country enter into a joint educational campaign with a view to acquainting the general public with the true condition of the various companies. He laid particular stress on the fact that in this way the co-operation of the people can be obtained. Mr. Insull also urged the various companies to offer for sale and to put on campaigns to induce their patrons to buy stock, thus making the companies more or less co-operative.

Mr. Insull also addressed the convention on Wednesday, this being his principal address. As senior vice-president of the Middle West Utilities Company of Chicago, which operates in more than 500 towns of the Middle West and East distributed in fifteen states, Mr. Insull stressed the value of publicity. The general public must be informed of the credit conditions of the various electric light and power and traction companies if the credit of these companies is to be restored and maintained.

Mr. Insull described the national advertising campaign projected during the last year by the National Electric Light Association, and explained that more than $1,000,000 had been spent to finance it. He said that this campaign is to assist the central stations of the electrical industry in obtaining friendly public opinion. For, he declared, if local agitation would die out, the ability of the local utility company to secure money would be improved. Mr. Insull declared that the American public is absolutely fair, provided facts are presented to it, and that the public utility companies need have no fear of the outcome if they centered in a publicity campaign.

President Hardgrave, Texas manager of the Middle West Utilities Company, in his annual address, delivered at the opening session, also stressed the need for a publicity bureau for the public utility companies. He declared that confidence between the public utilities and the people must be established, for, he said, the growth of a community depends upon the growth of the public utilities. One sure way to obtain this confidence, he said, is to encourage the purchase of stock in the utilities by the public. Mr. Hardgrave also recommended several changes in the constitution of the association, one being that the rule providing that the third vice-president be automatically promoted until he shall become president of the association be abolished. Mr. Hardgrave also stressed the importance of committee work, and recommended additional committees and that more questions be referred to committees for action. Work in committee, he said, will greatly increase interest in the association and promote efficiency in its work.

The report of the recently appointed "public policy" committee, of which W. B. Tuttle, first vice-president of the San Antonio Public Service Company, was chairman, was read and adopted. This report also laid great emphasis on the importance of a publicity bureau for the association. Mr. Tuttle recommended that a trained newspaper man be employed to head the bureau and that his special duty would be to keep the members of the association and the newspapers of the state informed about the public utilities. Mr. Tuttle also said that the best way to get the people of Texas interested in their public utilities is to induce the people to invest in the utilities.

The report of Secretary H. S. Cooper summarized the work of the secretary during the year and gave some statistics of the association. The association has now 166 member companies among the privately owned public utilities in Texas and the Southwest and there are also a number of honorary members, the secretary being one of them.

J. H. Gill, assistant general manager of the Dallas Power & Light Company, addressed the convention on Friday. Mr. Gill declared that many towns have literally starved their public utility companies to death, through lack of knowledge of what the utilities were doing. It is the duty of the people to come to the aid of these companies, he said, and added that in nine cases out of ten the aid needed will be forthcoming if the people are informed of the real conditions. Publicity and direct interest of the public in the utility company through stock ownership were the underlying thoughts of Mr. Gill's address, and his recommendations met the indorsement of the convention.

E. P. Schoch, head of the department of chemistry of the University of Texas at Austin, made a brief address, explaining in technical terms the latest developments in the tests of Texas lignite as fuel for steam boilers. Mr. Schoch predicted that developments soon would prove that Texas lignite is the cheapest boiler fuel that can be had in Texas.

The trend of legislation in regard to utilities was discussed on Saturday, the closing day of the convention. A plea for state control and sound financing marked the papers and addresses.

FORMER MISSOURI COMMISSIONER ADDRESSES CONVENTION

Senator William G. Busby of Kansas City, former chairman of the Public Service Commission of Missouri, discussed "State Utility Commissions." Mr. Busby first told of struggles the commission had had to obtain proper recognition from both the utility companies and the general public. He then related the work of the commission and told of the success that had been its lot. He declared that the life, health and happiness of the people and the progress and growth of a community or city depend upon strong, healthy utilities, and that it is to the interest of the people that the public utilities should be treated fairly in the valuation of their property and in fixing their rates. He further declared that this degree of fairness could be obtained only through state utility commissions. In regard to sound financing Senator Busby said that every community is known by the character of its utilities and that people do not want to live or transact business in a city or community without utilities, transportation and power and lighting facilities, and that unless the utilities are treated fairly, investors will refuse to advance funds for their development or extension and the public will eventually be the loser.

M. H. Gossett of Houston, president of the Federal Farm Loan Bank, next gave his viewpoint of financing Texas utilities. Mr. Gossett said the franchises granted to any utility should be protected by the community, for where competitors are permitted, the service of the utility is impaired and the financial rating of the company lowered. He illustrated his point by mentioning the situation in Houston, where the jitneys are permitted to operate as competitors of the street railway lines. Mr. Gossett said the ideal way for financing any utility is by selling stock to the company's employees and to the public.

W. B. Head, vice-president of the Texas Power & Light Company of Dallas, discussed the trend of public utility legislation in Texas. He traced the development of such legislation step by step and told of the law now in effect that places the control of utilities in the hands of the city where such utilities operate. City Councils and city commissions in Texas, he said, are given as much power and authority over public utilities as Legislatures in other states. The viewpoint of any city is naturally unfair to the utility, he said, and the result is that utility companies in Texas are suffering. Community control of public utilities, as tried out in Texas, is an absolute failure, Mr. Head declared. Many times the utilities serve much territory beyond the jurisdiction of the city government, he said, and this makes it imperative that control be vested in a state commission.

Home town financing was discussed by S. J. Ballinger, commercial manager of the San Antonio Public Service Company, and G. W. Fry, general manager of the Abilene Gas & Electric Company.

At the concluding session Saturday, M. M. Phinney of Boston, formerly connected with the Stone & Webster interests in Texas, was elected to honorary membership in the association.

At the railway section meeting a number of interesting topics were discussed.

Committees appointed at the closing session of the general meeting follow:

Executive Committee.—Burr Martin, A. Hardgrave, C. E. Calder, Alba H. Warren, H. C. Morris, Charles W. Davis, S. R. Bertron, Jr., F. D. Murphy, W. B. Tuttle, G. H. Clifford, Howard Smith, R. J. Irvine, D. A. Hegarty.

Advisory Committee.—H. O. Clarke, K. L. Simons, F. L. Weisser, H. E. Danner, B. F. Cherry, A. Patterson, W. E. Wood, J. C. Kennedy, James P. Griffin, P. E. Nicholls, H. E. Borton, Frank Frost, P. A. Rogers, P. W. Campbell, C. Mason, L. L. Stephenson, H. B. Hearn, W. A. Darter, V. W. Berry, H. P. Hess, H. E. Hobson, F. G. Kune, C. A. Newning, Mac F. Sterrett.

Finance Committee.—J. E. Van Horn, R. G. Soper, C. H. Dickey.

RESOLUTIONS ON DEATH OF COLONEL STRICKLAND

Just after the convention adjourned news of the death of Col. J. F. Strickland of Dallas was received, and the meeting was immediately called to order again and the following resolution adopted:

> In the death of Mr. Strickland not only has this association lost a loved and respected member, but also one of its founders, its first president, and one who has, in the seventeen years since, been a wise counselor and a vital force in all its work.
>
> We feel further that the entire public utility interests of Texas have suffered an irreparable loss, for Mr. Strickland was the undaunted pioneer in the wide distribution of electric light and power and electric transportation throughout the state, and the people of Texas owe him a debt which can never be repaid.
>
> And finally, as an employer, a counselor, a friend—even as an acquaintance—we will all miss him deeply and mourn him sincerely. Ever ready to aid, to advise, to be of use; kindly, courteous, generous and always just, we feel in his death a sense of personal loss which, at this moment, it is impossible for us adequately to express.

Merchandising Transportation

This Is the First of Several Articles on This Subject—The Author Considers, First, the Principles Governing the Successful Merchandising of Transportation and Then Shows What the Employees Can Do to Help

BY W. H. BOYCE
General Manager Beaver Valley Traction Company, New Brighton, Pa.

THE EMPLOYEES' FIELD DAYS BEGIN AT 8:30 A.M. AND END AT 11:30 P.M., SO THAT ALL CAN PARTICIPATE

YOUR success and the success of your company depend upon your ability to sell car rides.

It matters not what the expenses are if you can so merchandise transportation that there is a comfortable space between the expense and receipt lines when graphically displayed.

Selling rides depends in a very great measure upon:

1. The loyal co-operation, knowledge, interest and ability of your employees.
2. The methods you pursue to secure co-operation, impart company business knowledge, create interest and reward ability.
3. The proper maintenance of track, rolling stock and schedules.
4. The quantity, character and timeliness of your advertising through newspapers, car cards or pamphlets.
5. Your heart and surface attitude toward your public.

One reason that the sale of street car rides has not kept pace with the strides made in the sale of any other commodity or service is that as a rule street railway companies (on the theory that they could not afford it) have not paid salaries sufficient to attract new, worth-while blood, or to hold their more progressive employees. This short-sighted policy is comparable to that of the merchant who curtails his advertising as his business declines, and then makes generous appropriations to the advertising department when he has more orders than he can fill.

If your case is a usual one, your receipts have not kept pace with your expenses. You need more car riders. You need more than the commonly termed necessity riding. Therefore you must be possessed of reliable and up-to-date records concerning your actual traffic conditions and the traffic possibilities which your system affords. Careful study of these records should precede your merchandising plans, which might well be tried out on one route before a general application is made.

If you say to yourself that nothing more can be done to secure additional riders for your system your case is hopeless. No wonder you are not being paid more. You are probably howling and raving at the newspapers, the public, the commissions and your employees. Those methods will not sell car rides.

Finding out when, where and how people get to work and learning what it costs those who are not your patrons, in time and money, will form a basis for getting additional car riders.

It is true that you may not be able to adjust your service or rates of fare to get them all, but if for a starter you can get a few from each mill, factory, store or movie, that will be a great help.

The riding habit is a desirable thing to have your public acquire. They will acquire it if you are ever mindful of their desires, convenience and needs.

You must be not only a good mixer but you must use that trait to better your relations with your public. You must bear in mind that your employees and your public are entitled to their own viewpoints of your treatment or your service, and you must be able to visualize both sides of each question.

You must know that customers are sensitive. They go where they are invited and continue their patronage where well treated.

Your rides must be of a marketable quality. You must sell them in the size package for which there is a demand.

Business of all kinds is being built on the theory of giving the customer what he wants, or what he would want if he knew all the circumstances. It is your duty to give him what he wants, so far as possible, and to acquaint him with all the circumstances.

Service that suits your car riders—not you—is the service that counts in merchandising transportation.

The success of any business depends upon the hearty co-operation of all the employees. It is impossible suddenly to get a perfect working force, and therefore a good working organization comes through the process of evolution and elimination.

To secure the co-operation of employees they must know and feel that they will always be squarely dealt with, that fair and impartial treatment will always be accorded them, due consideration being given to each contributing factor, and that merit, not influence, will win. This policy, supplemented by meetings at which the proper kinds of addresses are made and by thought creating and correcting bulletins, should produce the desired results.

Notice to Trainmen

June 6, 1919.

Saturday, June 7,

Will be "Big Day" for all Beaver Valley Traction men.

Can you put it through without an accident of any kind? I believe that you can.

Keep cool. Don't get excited.

Romp on your gong and keep your car under control. *Expect the other fellow to do just what he should not do.* Watch the track ahead—watch crossings, both ways. Be all business this day—be polite—be careful.

I thank you.

____
Superintendent.

Bulletin No. 334

June 9, 1919.

Notice to Trainmen

We thank you. Saturday *was* a "big day." You did fine work. You handled an immense crowd of people. *We knew you could get away with it. There was not an accident in which our trainmen were to blame.*

True, there were three occurrences:

1. Windows broken by load on passing truck.
2. Car and auto in slight collision.
3. Rear of car 411 touched by yellow car at Iroquois Place, Beaver.

It was a hard day for everybody, and despite the three occurrences mentioned, we are inclined to rate it 99½ per cent perfect for our own crews.

We expected a perfect score and you came very close to it.

Accidents cost us a lot of money and it all comes from funds that should go toward operation and wages. You save funds for payment of your wages when there are no accidents.

We commend you for your careful work of Saturday and want you to make a perfect score daily your standard.

____
Superintendent.

____
Safety Engineer.

NOTICES SHOWING THE RELATIONS OF MEN AND COMPANY

Notices were sent to the trainmen telling about the "Big Day," and when it passed without accident the men were commended.

This is an everlasting job.

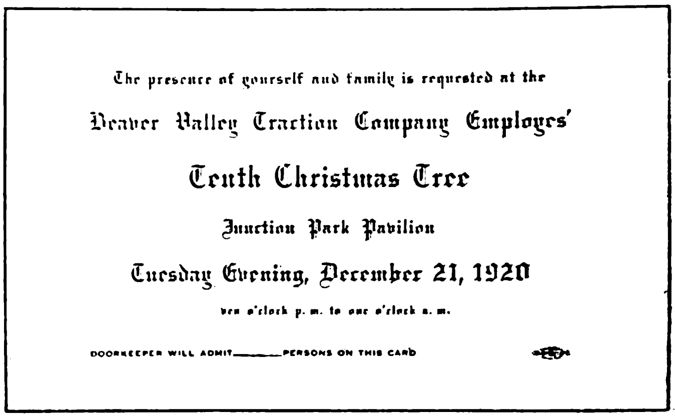
The knocker and the faultfinder are ever busy.

You must learn from all available sources causes of discontent. These sources may be secret as well as through your subordinates and employees' committee.

When causes are ascertained the remedy should be immediately applied, as it can be in most cases, for as a rule the cause is a trivial one.

Sometimes it is a hard matter to get the other fellow's viewpoint. You think of the days he has had off on full pay. He thinks of the overtime he has put in. You think of the enormous increase in his monthly wages. He compares the percentage of his increase with the percentage of increase that the laborer and steel mill worker has had. And so on to the dividing point if you and he don't get onto common ground and reach an understanding.

An understanding of how and why a good thing is done for him must be had by the average employee. He is naturally suspicious of anything "just handed to him." If you contemplate the presentation of a free life insurance or health policy or the creation of a pension fund, your employee must be made first to understand the why and wherefore and made to desire earnestly that which you would give. To thrust such things upon him creates suspicion.



The presence of yourself and family is requested at the

Beaver Valley Traction Company Employes'

Tenth Christmas Tree

Junction Park Pavilion

Tuesday Evening, December 21, 1920

ten o'clock p. m. to one o'clock a. m.

DOORKEEPER WILL ADMIT_______PERSONS ON THIS CARD

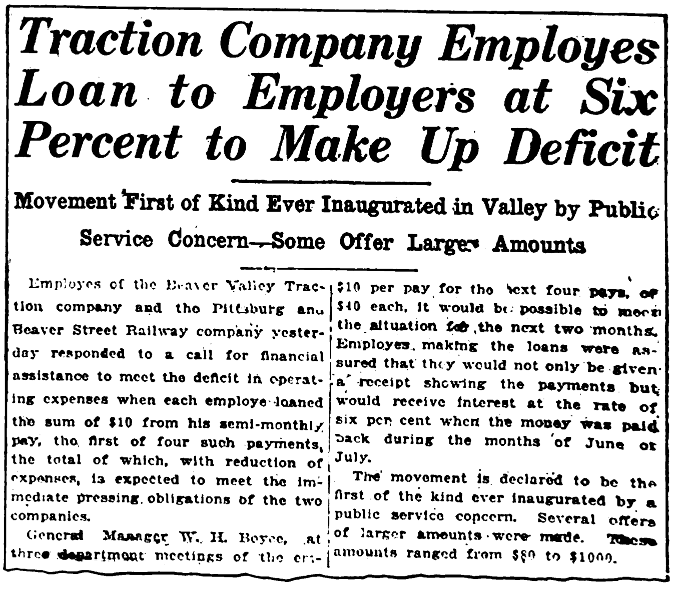
CHRISTMAS IS ALSO CELEBRATED

Employees desire a medium of expression. Some of them prefer their committee. Some make use of the suggestion box and especially prepared suggestion blank, while some prefer to give expression to their views and feelings in an interview with an official of the company. These safety valves must all be kept free and working.

No matter how small the system no one man is big enough or closely enough in touch with all the conditions to know it all.

If an employee makes a verbal or written suggestion, whether good or bad, a written acknowledgment of that suggestion must be made and the employee advised of the action taken or contemplated. If the suggestion is not considered applicable, a reason must be assigned. The next suggestion of that same employee may save you hundreds or thousands of dollars. However, the next suggestion will not be forthcoming if your employee has any reason to feel that it will not receive careful consideration. Make an appeal for suggestions on some specific topic. Make of your suggestion box a question and answer box.

Department heads, as well as the rank and file, must



Traction Company Employes Loan to Employers at Six Percent to Make Up Deficit

Movement First of Kind Ever Inaugurated in Valley by Public Service Concern—Some Offer Larger Amounts

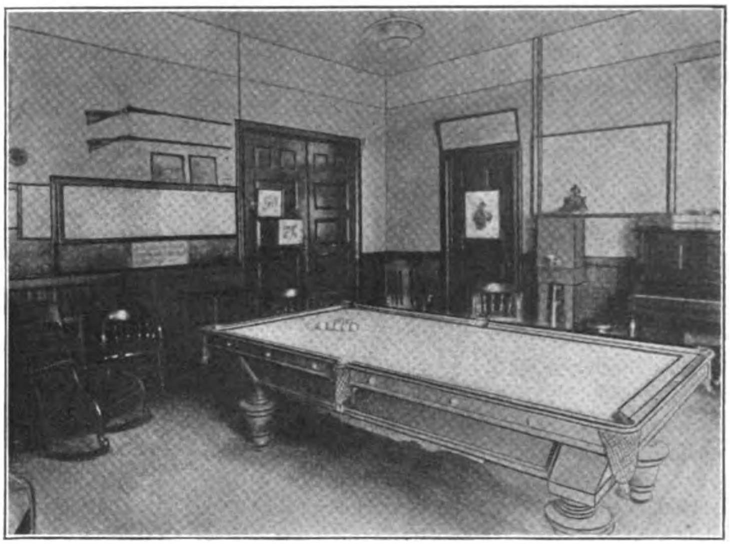
Employes of the Beaver Valley Traction company and the Pittsburg and Beaver Street Railway company yesterday responded to a call for financial assistance to meet the deficit in operating expenses when each employe loaned the sum of $10 from his semi-monthly pay, the first of four such payments, the total of which, with reduction of expenses, is expected to meet the immediate pressing obligations of the two companies.

General Manager W. H. Boyce, at three department meetings of the em- $10 per pay for the next four pays, or $40 each, it would be possible to meet the situation for the next two months. Employes making the loans were assured that they would not only be given a receipt showing the payments but would receive interest at the rate of six per cent when the money was paid back during the months of June or July.

The movement is declared to be the first of the kind ever inaugurated by a public service concern. Several offers of larger amounts were made. These amounts ranged from $80 to $1000.

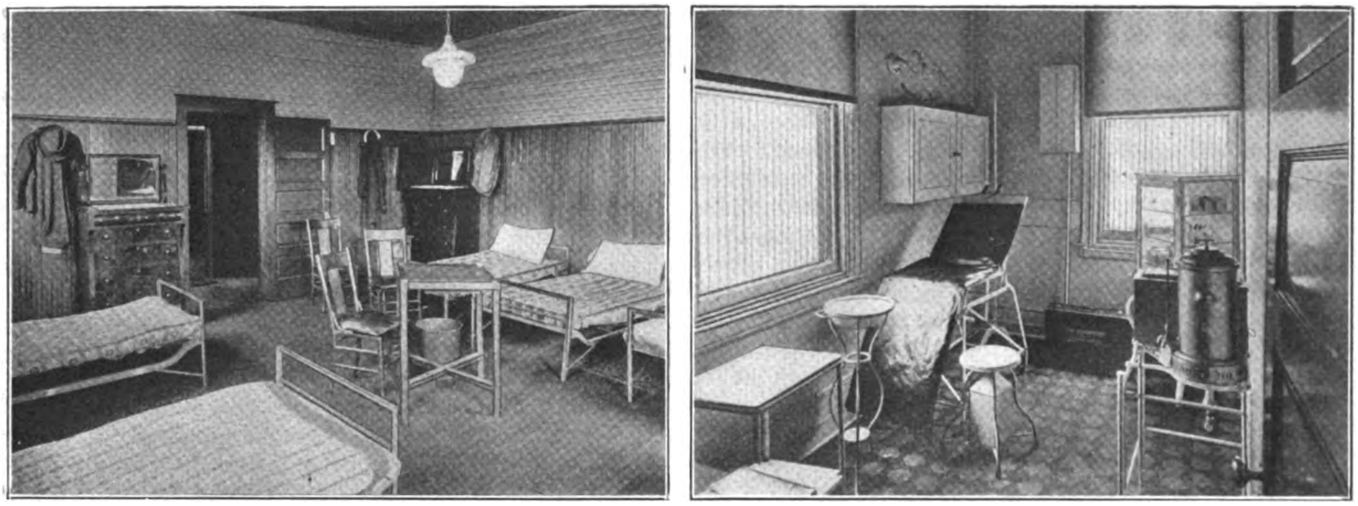
CLIPPING SHOWING WHAT THE MEN THINK OF THE MANAGEMENT at all times co-operate. They are not co-operating if they are faultfinding and complaining of the methods in vogue in other departments. It should be distinctly understood that it is not only the privilege but the duty of the head of one department to take up verbally with the head of any other department any known condition which is not to the best interest of the company or its employees as a whole.

Misunderstandings will be cleared up and may be prevented through the medium of frequent individual and round-table meetings. However, little good can result from these department head meetings if a choleric, self-opinionated individual presides. He must be big and broad enough to weigh carefully any proposition advanced.



Deliver me from being a stock, bond or job holder on a property the head of which "knows it all."

He who surrounds himself with subordinates who never have an original idea and who if they do have one occasionally are fearful of the consequences of advancing it is riding to a fall. Of what use are subordinate officers who agree with each and every proposition advanced by the management?



VIEWS IN THE MEN'S ROOMS; PREPARED FOR ALL THE NEEDS—RECREATION, REST, CURE

Railway managers today don't need vanity ticklers or looking glasses. They need the services of cartoonists. The following will help to secure the good will and co-operation of employees:

1. Get-together meetings such as at a Christmas tree celebration or a field meet for employees and their families.

2. The serving of hot coffee at a predetermined minimum temperature and iced tea or lemonade on July 4 or other holidays or days of heavy traffic on which employees are compelled to work unusually hard or overtime.

3. Free lunch for employees working overtime during stormy weather.

4. Properly caring for those injured through no fault of their own.

5. Insistence that men be not reprimanded in public.

6. Advertisements directed to the public acquainting them with the difficulties a public service employee encounters in a day's work and asking their indulgence and co-operation. Be sure that your employees see these advertisements.

7. Keep employees' quarters or lounging rooms clean and attractive and fitted with amusement devices.

8. Provide loan fund to keep them out of the hands of loan sharks.

9. In individual cases that demand it, furnish free medical or legal advice.

10. Give time and consideration to an individual employee or a committee of employees.

11. Keep the door open and give them the benefit of the judgment of individuals of your staff on personal matters.

12. Keep them acquainted with financial condition of the company.

13. Don't fail to give credit where credit is due.

The following statement is from a handbook given to each employee by the company with which the writer is connected:

> To the unlearned and the one who will not take the trouble to find out, and the one who will not be convinced when shown the facts, the solution of the street car problem is always "Too much watered stock." They *do not know anything about it. It is not a fact as applied to these lines.*
>
> ***Besides—***
>
> Organization of the company or the amount of stock issued has nothing to do with the *service* you are to give the patrons of this line. All people must at times have something to be dissatisfied about. Many people pick the street car company and its employees for expression of that dissatisfaction—that is to be expected. In days gone by street car companies would let them go ahead and not enter any protest, and as a result, in the way of the "bully" who displays his power over the weak, a great many contracted the habit. That very growing popularity of find-

ing fault with the street car company has forced that animal to back up against the wall and fight for his very life.

Now—

Exhausted in finance, and wilted by competition, the tables are turning and the day looms up that the people must respect the rights of the company or the burden of furnishing this popular method of transportation will fall upon each community to furnish or do without. Up to the time of going to press with this book, a total of 498 miles of track was abandoned in the United States in the year 1918 alone.

And—

in no case did the faultfinders come forth and supply adequate transportation—the lines remain dead; property values dropped to a small percentage and live wire citizens deserted the community, *for with the loss of the cars life was not worth while there.*

So long as the company pays your wages (and be it in your opinion a just or an unjust wage, it is the one you agreed to work for), your every act should be in the interest of this company and when *you find it difficult so to act, we will gladly grant you a permanent vacation without pay. We have so many others to contend with that each employee should help lighten our burdens and good will then result for both of us.*

Getting More Power Out of the Locomotive

AT A MEETING of the New York Railway Club held in New York on May 20, 1921, George M. Basford read a paper on "Vitalizing Locomotives." This is of interest to men interested in the development of the electric locomotive as showing what this machine is up against by way of competition.

As an example of the progress that has been made with the steam locomotive Mr. Basford cites a well-known road which has increased its average revenue tonnage from 400 to 1,700 per train in twenty-five years, the maximum revenue tons handled in a regular train being 3,200. This road shows 233 per cent increase in weight of trains and 66 per cent increase in speed in this period. It hauls 5,000-ton trains on 25-mile schedules. Taking the country as a whole the average revenue train load increased from 475 tons to 728 tons since 1915, an increase of over 53 per cent. Increase in capacity of the steam locomotive has been due particularly to the superheater, the brick arch, the feed-water heater and the booster. Since 1910 the railroads have applied 33,000 superheaters to new and old locomotives, about 90 per cent of the new ones having been equipped during the past few years.

For many years arches have been used in locomotive fireboxes, their functions being to baffle the gases and flame on their way to the flue. Arches protect flues and flue sheets, increase the heat-making capacity of the coal and reduce boiler failures. In present practice they are carried on arch tubes which not only support the arches but contribute materially to forcing the circulation of the boiler. More than 43,000 locomotives now have these arches.

The application of the feed-water heater to the locomotive has been attempted many times and has waited only for a practicable heater and pump. Europe is far ahead of the United States in applying feed-water heaters to the locomotive, although for generations stationary and marine steam plants have used them as a matter of course. They have, however, been in successful use on locomotives during the four years past, returning for reuse about 15 per cent of the exhaust steam in the form of distilled and filtered water. The result is an increase in tender tank capacity, while at the same time heat from the exhaust steam is returned to the boiler in the feed water.

The booster is an auxiliary driving equipment which boosts the train in starting and at critical points on grades. It utilizes weight and steam that are not needed for other purposes at low speed, the only speed at which the boost is needed. The booster works like an automobile in low gear; it applies its extra power smoothly, avoiding the jerks that a big engine otherwise must give in order to get started.

House Approves Commerce Estimates

Would Give Hoover Funds to Carry Out Plans, Among Them Study of Possible Furthering of Standardization

WHILE it took a special rule to do it, the House of Representatives has approved the supplemental estimates for the Department of Commerce, recommended by the committee on appropriations, for extending the export trade; for investigating structural material; for assisting in the establishing of industries developed by the war and for standardizing electrical and mechanical devices used in industries. What opposition existed was entirely on political grounds, but the attack did not have the backing of the Democratic leaders, however, as Representative Byrnes, the ranking Democrat of the appropriations committee, declared that it was not a question of politics; that the business and the general interests of the country demand the promotion and extension of our commerce, domestic and foreign, and that every possible aid should be given to the administration.

Representative Good, the chairman of the committee on appropriations, in explaining the feeling of the committee in regard to the appropriations for the Department of Commerce, said, among other things:

"Mr. Hoover realizes that conditions in the world today are such that it is going to take the very best men he can get as counselors and advisers to help advise American industry and American commerce how our trade with foreign countries can be extended and enlarged. I was unwilling and the ranking Democrat on the committee was unwilling and every member of the committee on appropriations was unwilling to take the responsibility for denying this appropriation." In supporting the Bureau of Standards items, Chairman Good said, in part:

"Secretary Hoover called attention to the fact that through the National Screw-Thread Commission the hardware dealers of America were saved a capital charge of from $15,000,000 to $50,000,000 on their stocks of bolts alone. Mr. Hoover is convinced that hundreds of millions of dollars can be saved if a standardization of hardware alone can be brought about. So it is in all of the industries. Mr. Hoover estimates that one of the big elements of increased cost is the great number of different standards that every dealer must carry.

"The Secretary has in mind to build up an industrial unit that will standardize these various items. It is a big idea. It is a big thing. The Secretary of Commerce has done big things. He will do big things in the future for the country, if we of the House can adopt a progressive, constructive policy upon which he can build. We have placed in the Department of Commerce one of the greatest engineers in America and we are going to support him."

The Plight of Vienna's Railways

Austrian Capital Has Little More Than the Ruins of a Once Efficient Transportation System—Lack of New Material, Worn-Out Equipment, Decreased Traffic and an Inflated Currency Make Recuperation Difficult and Slow

THE end of the war found the electric railways of Vienna in a position extremely difficult in several ways. The exigencies of the war have taxed both the roadway and the rolling stock of the lines to an unprecedented extent. While the population of Vienna and the traffic increased, means of transportation were reduced. The municipal steam-operated lines were to a large extent reserved for the transportation of troops, and the number of horse-drawn and motor vehicles diminished gradually. This produced a large influx of street car passengers. The street car lines played an important part in the Red Cross service, more than 1,200,000 wounded having been carried by them during the war. Many cars were adapted for ambulance work and were withdrawn from ordinary passenger traffic.

Moreover, the lines took a large, and during the war increasing, share in the goods transportation within the precincts of the city. Even under ordinary circumstances such strain would have resulted in a run-down condition of the whole system. The shorthandedness in the repair shops and the increasing use of substitute material have added to the extent and progress of the deterioration. The limited resources of copper were reserved solely for army requirements. Steel wire for the overhead lines and aluminum as a substitute for the copper conductors of the motors had to be used. Especially the lack of good quality lubricants tended largely to wear out the rolling stock, and indirectly also the rails. At the end of the war the difficulty of maintenance, instead of diminishing, had increased.

The disorganization of all Austrian industry following the armistice produced a more serious stringency of material than ever existed before. The general labor unrest seized the repair shops of the street railways, the efficiency of which sank down in a sharp curve. Progress of work was frequently interrupted by strikes. Cars were withdrawn from service in increasing numbers, and the workshops were clogged by accumulations of repair work. To such conditions was added the distressing shortage of coal. Vienna has lost its main coal resources by the armistice to Czecho-Slovakia. The present Austria has deposits of coal, chiefly brown coal, the exploitation of which had, however, been neglected in pre-war times, and was, although considerably advanced during the war, at the end of it entirely inadequate for the country's requirements. Political and financial conditions prevented the country from obtaining sufficient supplies from other sources. As a result, the traffic had to be reduced considerably, and at times came to a complete standstill for days at a stretch. At the beginning of the coal shortage, which made itself felt even in the last years of the war, the number of stops were reduced from 980 to 682, as a remedy. This resulted in an energy saving of 8 per cent. Later on, lines were put out of operation entirely or partly. Also, operation was reduced according to the coal at disposal, sometimes to seven hours a day.

This shortening of working hours seems to have given the harassed management the necessary breathing spell for reorganizing operation and for making repairs. The difficulties had evidently reached their climax in 1919, and an improvement became apparent at the beginning of the subsequent year.

The basic factors of this improvement are the betterment of the coal supply and of the labor condition. Both have continued in a steady progress since then. The improvement of the system was, however, confined to narrow limits, not by the lack of efforts, but by the depreciation of the Austrian currency. The track mileage of the whole system has been increased since 1914 only by 7.5 km. (4.6 miles) to 274 km. (170 miles), 20 km. (12.4 miles) of which are operated by steam, the rest by electricity. All railroad terminals are now connected to the street-car system. For the new track, rails of the grooved-girder and the T-section type have been used.

For overhead conductors round copper wire of ⅜ in. diameter has been adopted, in place of the wire of special section used before. The tendency is gradually to replace the steel wire by copper wire, as expenses permit.

SYSTEM OF RADIAL AND RING LINES INTRODUCED

Many changes have been made with regard to routing. The old-time cross-town routes, connecting widely distant parts of the city by a circuitous way, have dwindled down to fourteen. According to the layout of the city, the main traffic is now being taken care of by a system of forty radial lines, intersected by ring lines. Fourteen of such ring lines are now in operation, the inner circle being the ring street, the famous boulevard of Vienna.

The number of cars in use has since the beginning of 1914 been increased by fifty-six motor cars, up to 1,542, and by seventy-nine trailers, to 1,628. It speaks well for the enterprise of the management that with a few exceptions this increase was effected in post-war years, in spite of the enormously grown expenses, the price per car being now 2,500,000 kronen ($6,250 as of May 18, 1921) compared with 25,000 kronen ($5,075 normal exchange) before the war. All additions to the rolling stock are fitted with the latest improvements, the motor cars being of the double-deck type, with specially cushioned trucks. The platforms of these cars and those of the trailers are completely inclosed. The separation of entrance and exit, introduced in Vienna simultaneously with America, is rigidly adhered to. The mechanical equipment of the cars has remained unchanged. As a novelty may be mentioned the gradual replacement of spur gears by herringbone gears of the Maag type.

Experiments have been made with street-sweeping machines attached to the cars, the testing of which is not yet completed. For the housing of the cars, several sheds have been erected, three of which are of reinforced concrete construction, with sufficient space for

270 cars. To the street car system is connected a system of several motor-bus lines, to act as traffic conveyors to the terminals of the lines. One of these lines is of the trackless-electric type. The whole rolling stock of this service consists of 47 cars.

HEAVY FREIGHT TRAFFIC DURING THE WAR

The goods transportation of the system decreased, due to the stoppage of military transport. From 1914, when goods transportation on street railways was introduced, up to the middle of 1920, nearly 1,400,000 tons were transported. It might also be mentioned that the Vienna street railways played an important part in the American relief work for the Viennese children in the transportation of food, of which 511 tons were conveyed during the year June, 1919, to May, 1920.

The accidents showed a decrease. The following data are given in this respect:

	1919-20	1918-19
Accidents, total	6,012	7,400
Number of injured	466	635

Most of these accidents were caused by passengers jumping on or off cars while in motion. Accidents of this kind averaged 5 per 1,000,000 passenger-rides. Of the total, 1,308 accidents were due to collision with other vehicles, 520 to knocking down of pedestrians crossing the lines, and the rest to various other causes. Eight hundred claims for damages were brought in against the street car company, of which 560 were settled by agreement and the rest in court. The total damages paid during 1919-20 amounted to 1,044,000 kronen for personal injuries, and 200,000 kronen for damage to property.

The following is an account of the operation and the revenue for the year June, 1918, to May, 1919, and the same period 1919-20:

STATEMENT OF INCOME

	1919-20 Kronen	1918-19 Kronen	Per Cent Change
Passenger revenue:			
Single fares	485,354,465	154,043,771	215.1
Time tickets	16,166,657	3,552,878	355.0
Line tickets	9,449,570	1,906,862	395.0
Special cars	115,725	99,754	16.0
Freight revenue	1,204,496	928,423	29.9
Total	512,290,913	160,531,688	
Share in revenue of Vienna Steam Railway	1,865,473	650,586	186.7

TRAFFIC STATISTICS

	1919-20	1918-19	
Car kilometers:			
Motor cars	36,740,953	37,304,283	*1.5*
Trailers	48,990,656	50,494,731	*3.0*
Freight cars	1,301,250	1,176,212	10.5
Total	87,032,859	88,975,226	2.1
Kilowatt-hours used	40,641,939	43,256,667	*6.0*
Revenue passengers:			
Single fare	443,004,424	531,626,528	*16.7*
Time ticket	21,415,200	16,159,800	32.5
Line ticket	16,629,124	12,427,572	33.8
In special cars	446,715	498,767	*10.4*
Total	481,495,463	560,712,667	14.2
Number of parcels carried by freight department	21,156	30,156	*29.8*

NOTE—Figures in italics indicate decrease.

The highest daily receipts of the year 1919-20 were 2,700,000 kronen and the lowest 492,000 kronen, the latter on a day on which operation was reduced to seven hours.

The most incisive change with regard to the Vienna street railway system is the increase of the rate of fares. Before the war the fare was 0.14 kronen (2.8 cents) on weekdays, and the highest fare 0.20 kronen (4 cents) on Sundays. It is at present 5 kronen ($1.02) on ordinary days and 7 kronen ($1.42) on Sundays. As a peculiarity it may be mentioned that the fare to the Vienna racecourse, roughly 2½ miles from the center of the city, has been fixed at 30 kronen ($3.09). For fares on late cars, running after the closing hour, chiefly for the connection between railroad terminals, 10 kronen ($2.03) is charged. Blocks of tickets of five each, at a reduced price of 4.50 kronen (91.5 cents) instead of 5 kronen, can be bought in advance, as a convenience to passengers. A very large use of these is being made. For the working people, cheap tickets for 3 kronen each are issued, available up to 8 o'clock in the morning. Transfer tickets have been abandoned completely, and instead return tickets were introduced at 7 kronen, available for two rides over the same line in one day. Children's fares are 1.50 kronen (30.5 cents). These equivalents are in pre-war exchange. From the following list the movement of the fares can be seen:

Changes in Rates of Fare		
Up to June 7, 1916	0.14 kronen	(2.8 cents)
June 7, 1916-Aug. 28, 1918	0.22 kronen	(4.5 cents)
Aug. 28, 1918-June 11, 1919	0.30 kronen	(6.7 cents)
June 11, 1919-Dec. 3, 1919	0.60 kronen	(13.4 cents)
Dec. 3, 1919-Feb. 18, 1920	2.00 kronen	(40.6 cents)
Feb. 18, 1920-Jan. 27, 1921	3.00 kronen	(60.9 cents)
Jan. 27, 1921	5.00 kronen	(101.5 cents)

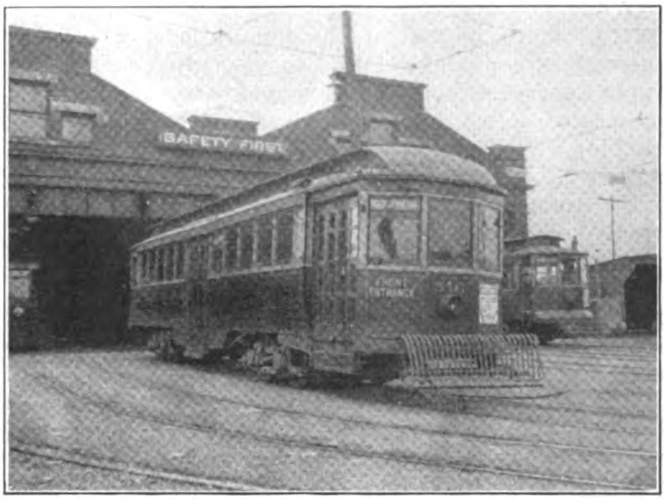
The rise of the fares was in each case followed by a sharp decline in the number of passengers. The experience was that after each drop of this kind a recovery set in, the number of passengers increasing steadily, and ultimately settling down somewhere in the middle between the highest and lowest point of the decline. The revenue did not, therefore, rise in proportion to the increase of fares.

No figures are available for expenditures, but the fact that the street car system, which is owned by the community of Vienna, is still needing a large subsidy, makes it evident that the revenue did not keep pace with expenditure. The following data indicate the ratio of increase of the main items of expenditure and of the revenue, and the relation in which both stand to the depreciation of the currency:

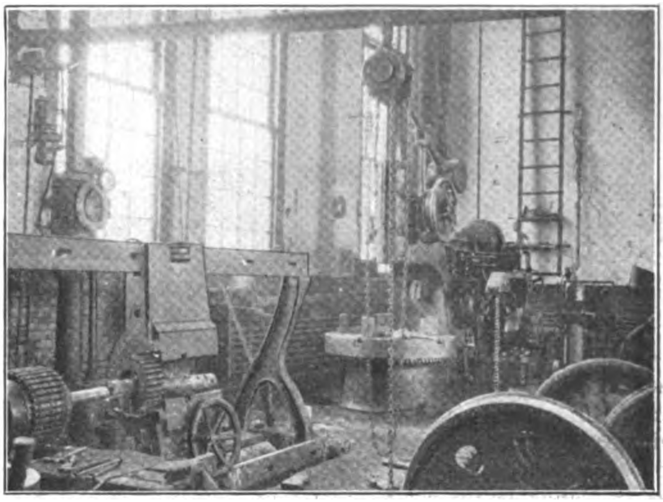
Depreciation of currency	1 : 127
Rise of rate of fares	1 : 35
Increase of wages	1 : 35
Increase in cost of new track	1 : 75
Increase in cost of rolling stock	1 : 100

REVENUE STILL MEAGER COMPARED WITH OPERATING COSTS

The increment of revenue is not even sufficient to offset the increase of operation cost. The enormously increased cost of maintenance stands, however, quite out of proportion to the present revenue. Although the strictest economy is observed, it is impossible to balance the expenditure. The street car system is a heavy burden on the already overstrained finances of the city, which is finding it very hard to supply the funds necessary for its upkeep. The State Treasury will, therefore, have to come to the rescue, if general conditions do not improve, but of this there is a fair promise. A marked betterment of trade conditions and industrial activity is also noticeable, and the town traffic is consequently picking up. If this improvement continues, the street car system will gradually get back into a healthier condition.



THIS VIEW PROVES THAT THE NEW YORK STATE RAILWAYS, UTICA LINES IS BEHIND THE SAFETY MOVEMENT



WORK IS A PLEASURE IN THIS BRIGHT AND CONVENIENT CORNER IN THE WHEEL SHOP AT UTICA PARK

Shop Notes from Utica

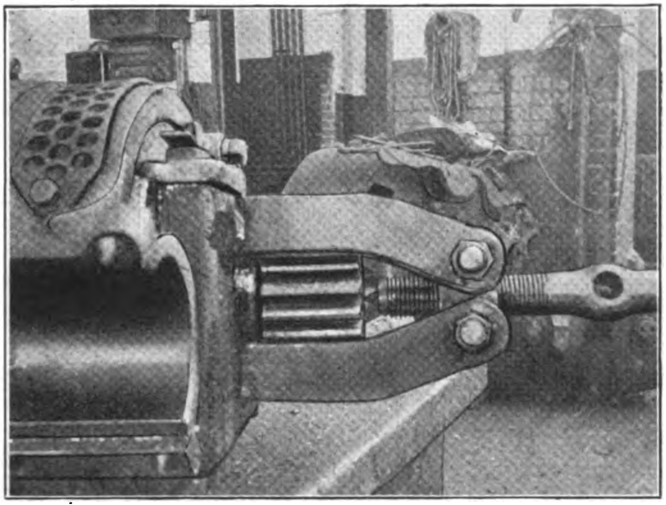
Some Kinks that Have Proved Useful Locally in the New York State Railways' Maintenance Work—Attention to Details Is the Particular Feature Which This Article Aims to Stress—Some Items Mentioned Are a Pinion Puller, a Paint-Spraying Outfit, Jigs for Reclaiming Worn Commutator Segments and a Heater-Coil Winder

THE shops of the New York State Railways at Utica Park, Utica, were recently rehabilitated. The changes were covered in an article by H. S. Sweet, then master mechanic at this point, appearing in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, 1920, page 567. Mr. Sweet showed how a few inexpensive changes had almost doubled the overhauling capacity of the shops. The shops are not only well laid out for their purpose, but in them a number of kinks have been developed which also tend to facilitate maintenance work.

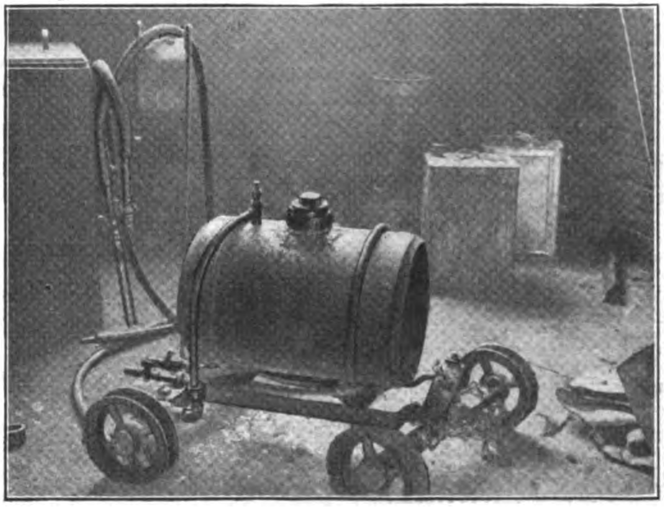
A typical shop corner is shown in one of the photographs reproduced, which features a type of wall gib crane found very useful in the shop. It consists simply of a piece of T-rail hinged to the wall with a guy rod above. The T-rail boom carries a differential hoist, traveling on a trolley. This corner is in the wheel room and it contains the wheel press and boring mill conveniently placed to facilitate wheel and axle handling.

Another illustration shows a convenient pinion puller, consisting of two links made of steel straps which are hinged on a nut. Through the nut passes a threaded rod with pointed end for centering in the end of the motor axle. When the links are hooked over the pinion and force is applied, the links tend to bind tightly on the pinion and do not slip off. With this device pinion pulling is a very simple operation.

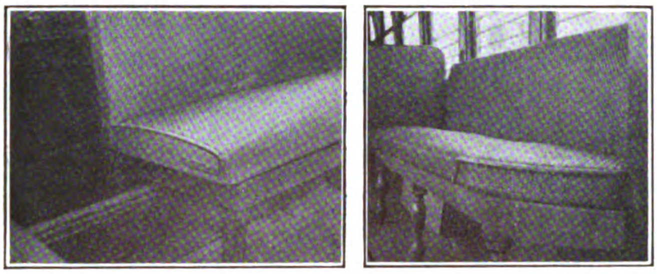
Another time and money saver is a pair of tools used in cutting down worn controller segments to render them available for reuse. The left-hand device shown is a clamp to hold the worn bars and acting as a saw guide during the cutting-off operation. A pin on the



A ONE-MAN PINION PULLER THAT WON'T SLIP OFF AS IT IS TIGHTENED



THIS QUEER LOOKING DEVICE IS A HOME-MADE PAINT-SPRAYING MACHINE



SEAT CUSHION GUARDS WHICH SAVE THE EXPOSED EDGES

inside of the clamping box, not visible in the picture, acts as a stop. The right-hand device is the jig for use in drilling. The construction is similar to the sawing jig except that the clamp is provided with a hardened bushing as a drill guide and there is no base, the device as it stands being very convenient for use in the drill press.

Another useful little device is a motor-driven winding machine, used for winding up heater coils on porcelain cores. The particular feature here is the provision for preventing breakage of the cores by excessive and irregular application of force in clamping. The spindle which carries the porcelain core is supported only at one end, which may for convenience be termed the headstock. At the headstock end of the spindle is a cup-shaped socket to receive one end of the core. The spindle also carries an adjustable clamp on which is mounted a second socket, attached to it by means of a coil spring. When clamped between the two sockets, the core is flexibly but firmly held to the spindle.

HOME-MADE PAINT-SPRAYING DEVICE IS USED IN UTICA SHOPS

As some spray painting is done in the shop, the portable spraying machine shown in another picture is found very useful. This consists of an auxiliary air-brake reservoir mounted on a tiny truck which rolls on old trolley wheels. Air pressure is applied to the reservoir to force the paint to the nozzle where it meets a stream of air supplied from the shop's compressed-air system. The nozzle used in connection with this device is also home made, consisting simply of a short straight piece of ½-in. gas pipe with another piece entering at the side, stop cocks being inserted in both pipes to control respectively the flow of paint and air.

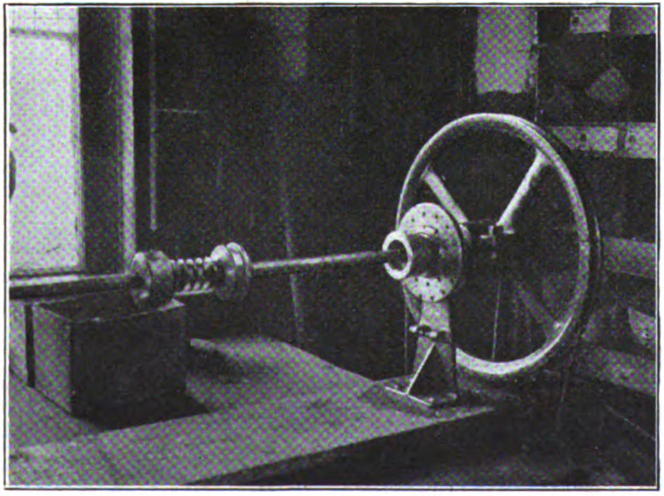
While not exactly a shop matter, the iron cushion guard, shown in two of the illustrations, will be of interest as a product of this shop. On account of the rapid wear of cushion edges exposed to use as foot rests, or located at points where they would be subjected to rubbing, the shop management bent up some ¾-in. rods, flattened out the ends and drilled the resulting guards for convenient attachment to the cushion frame. The result has been a greatly increased cushion life.

The picture at the head of this article is a view taken in front of the carhouse adjoining the Utica shops. It features two items: The enormous safety-first sign, which reaches the eye of the motorman of every car entering the barn; the other is the car in the foreground, which is one of a number remodeled from the open type for front-end center-entrance fare collection. This car, as Kipling would say, "is another story," which was told in last week's issue.

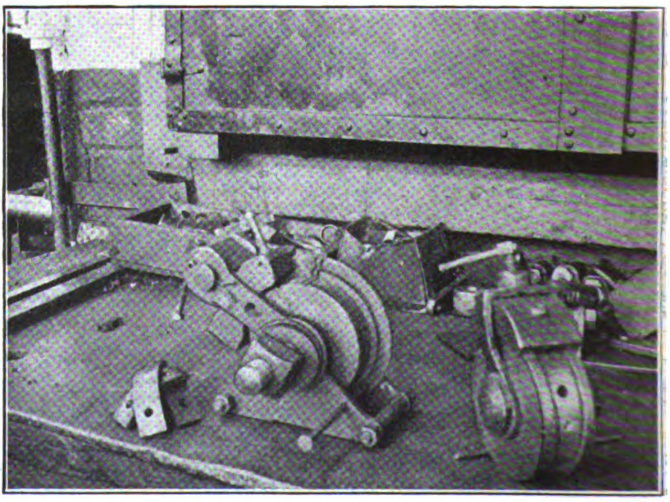
A. S. M. E. Nominations

AT THE MEETING of the American Society of Mechanical Engineers, held in Chicago May 23 to 26, the report of the nominating committee was presented, which, although the nominations must be submitted to the society for letter ballot, may be assumed to represent the choice of the membership.

The list of nominations is as follows: For president, Dexter S. Kimball, dean College of Engineering Cornell University; vice-presidents, Col. E. A. Deeds, Dayton, Ohio; Robert Sibley, McGraw-Hill Company, Inc., San Francisco, Cal., and L. E. Strothman, Milwaukee, Wis.; managers, W. S. Finlay, Jr., New York City, to fill out Dean Kimball's unexpired term as manager, S. F. Jeter, Hartford, Conn.; H. P. Liversidge, Philadelphia, Pa., and Hollis P. Porter, Tulsa, Okla.; for treasurer, Major William H. Wiley, New York City, who has occupied this office for thirty-seven years. To represent the society on the board of the Federated American Engineering Society the following were nominated: Francis Blossom of Sanderson & Porter, New York, N. Y.; Charles A. Booth, Buffalo, N. Y.; Gano Dunn, president J. G. White Engineering Corporation, New York, N. Y.; H. H. Esselstyn, Detroit, Mich.; W. S. Lee, president Piedmont & Northern Railway, Charlotte, N. C.; I. E. Moultrop, Boston, Mass.; John A. Stevens, Lowell, Mass.; A. E. Walden, Baltimore, Md.; Perley F. Walker, Lawrence, Kan.



A WINDING MACHINE FOR HEATER COILS WHICH DOES NOT BREAK THE CORES



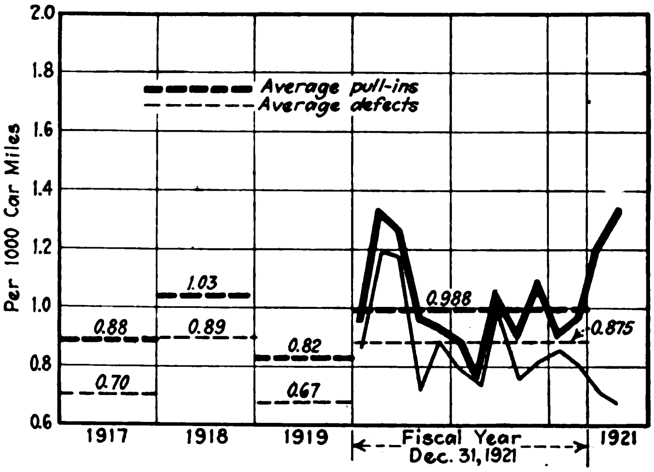
TWO JIGS FOR USE IN RECLAIMING CONTROLLER SEGMENTS

Master Mechanic Proves His Worth

Statistics of Pull-Ins and Car Defects Tell Graphic Story of the Efficiency of the Master Mechanic—Graph Also Acts as Check on Transportation Department

ON A CERTAIN property, which must necessarily remain unidentified, statistics are kept and recorded graphically for each carhouse with reference to all pull-ins on the basis of number of pull-ins per thousand car-miles and corresponding records of defects are likewise plotted. Curves 1-a and 1-b were taken on this property and indicate graphically the efficiency of a certain master mechanic, "A," who was in charge of both houses. In connection with these two graphs, graph 2 should also be noted, because this is the property to which this particular master mechanic transferred when he left the former property. At the end of 1917, which, as noted, showed a very small number of pull-ins, master mechanic "A" left property No. 1 for a better opportunity at property No. 2. The year 1918 shows a record of pull-ins which is extremely high, and at the end of this year master mechanic "B," as he may be called, was removed to make a place for some one who might have an opportunity to make a better record. Master mechanic "C" was then installed and his record for 1919 speaks for itself, indicating him to be an efficient man. At the end of this year, for some reason, his services were no longer available to the company and he was replaced by master mechanic "D." New equipment was installed in carhouse *a*. The immediate rise in the pull-in curve of carhouse *b* is dramatic, and it is pertinent at this point to say that master mechanic "D" was relieved from his duties when this curve reached its peak, master mechanic "E" then coming on and making his presence felt by the immediate drop in this curve.

Returning to master mechanic "A," he entered the employ of the second company at the begining of 1918. Graph 2 is the record of the principal carhouse of his division, and it is seen that the year 1918 shows a low pull-in record as compared with the previous 1917 record for this house, and that 1919 shows a still lower record. In 1920 this man was promoted to another position in this company, and that the loss of his immediate presence was felt by the division from which he moved is apparent from the graphical analysis of the pull-ins and defects.

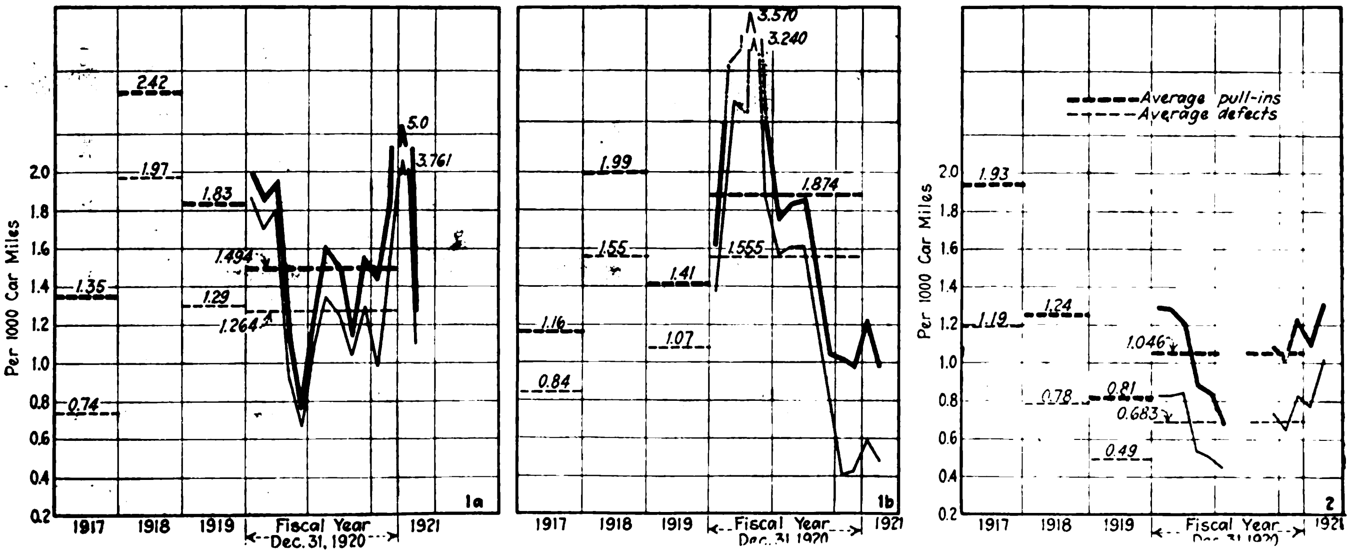


GRAPH SHOWING SPREAD BETWEEN DEFECTS AND PULL-INS AS A CHECK UPON TRANSPORTATION-MECHANICAL DEPARTMENT CO-OPERATION

TRANSPORTATION DEPARTMENT ALSO CHECKED

This method of keeping track of these two records of rolling stock also gives an opportunity to note the co-operation which exists between the transportation and mechanical departments. Theoretically, of course, the number of defects per thousand car-miles should coincide with the number of pull-ins per thousand car-miles; in other words, best operation by the transportation department would mean that there should be no pull-ins without cause.

The general management which operates this entire group of properties from which these curves are taken uses this as a basis of check-up on the transportation department with good results. In the single graph shown independently it is noted that toward the end of 1920 the spread between pull-ins and defects commenced to increase to alarming proportions, indicating a very large number of pull-ins where there was no defect. A new superintendent of transportation has been installed on this property with results which the management says amply justify its decision that this spread was due to poor supervision in the transportation department.



GRAPHICAL PORTRAYAL FROM TWO COMPANIES, SHOWING EFFECTIVENESS OF A MASTER MECHANIC WHO PROVED HIS WORTH

Motor Vehicles Must Pay Their Way

Commissioner of Highways of State of Connecticut Says Traffic Benefited by Highway Improvement Should Bear the Cost

AT A NATIONAL highway and traffic conference held at Yale University on May 23 the subject of traffic regulations in streets and on highways was discussed by several prominent leaders. Papers were presented by William Eno, honorary president of the Highway Traffic Association of the State of New York; William J. Bennett, Commissioner of Highways, State of Connecticut; Dean A. N. Johnson, department of engineering of the University of Maryland; Miss Harriet E. Beard, Department of Education, Detroit, Mich., and James W. Inches, Commissioner of Police, Detroit, Mich. There was a general recognition of the increasing problems of regulation of highway traffic and the need of leadership in this line of work. Mr. Eno outlined various traffic regulation schemes which have been placed in operation in various cities all over the world, in order to expedite the traffic. Miss Beard discussed the educational work which was being done in the schools of Detroit with a view to reduction of accidents in traffic. Dean Johnson discussed largely highway construction, and Mr. Inches the Detroit traffic regulation system.

Commissioner Bennett pointed out that there must be somebody, some central organization, to standardize practice and to lead. A highway administrative engineer, he said, must be a student of transportation rather than a technical expert of highways. He must study all kinds of transportation to see how the highways fit into the general scheme and how they should absorb their part of the load. He pointed out that at present there is an overdevelopment of highway traffic in proportion to the total, due largely to the overdevelopment of the vehicle which is used for highway transportation. In other words, there has been a short-sighted direction of capital in so far as the best benefit for the whole public is concerned. Funds have been devoted to the development of a vehicle and thus have not been available to the increasing of necessary rail facilities.

He showed that there are two classes of highway traffic, the first commercial, the second passenger, and that highway construction which will take care of the first will naturally take care of the second. Connecticut itself is in a peculiar situation, for, according to the manufacturers of motor vehicles themselves, 125 miles is the maximum of economical motor vehicle transportation of freight, and Connecticut lies in such a position geographically that it is within this limit of both Boston and New York.

Some of Mr. Bennett's figures are of great interest. Figuring the total cost of operating a certain type of motor truck in Connecticut as $26.09 per day, 11 cents of this is state tax. If the relative cost of operating this truck on dirt roads and on a hard, smooth surface, such as the state provides, is taken into consideration, it is figured that there will be about $3 saved in the day's expense by operating on hard smooth roads rather than on dirt roads. If this is turned into a license fee, as is logical, since this is the benefit derived from having the state construct a road, then the fee would be $750 per year compared to the present $27.50, figuring a 250-day operation in the year. In Connecticut particularly there is slight local benefit due to hard surface roads, so that traffic which uses the road should bear the cost.

The commissioner said he was not prepared to divide the cost between the two classes, but that a definition was desirable. He did state as a much-emphasized fact that the state should not subsidize commercial traffic on highways, but that it should get enough in fees to pay for the cost of rendering the service to this class of traffic. Commercial traffic on the highways is here to stay and it should pay for the extra service which is given to it.

As to the maximum load which could be carried on motor vehicles, the commissioner was not prepared to say, except that his own view was that 28,000 lb. gross was the greatest load that should be allowed upon improved highways. Of course, it would be physically possible to build a highway for any load, but some economic limit must be set and highways built to that limit. Connecticut now has a new bill, which will probably be passed shortly, the commissioner said, which will limit the truck to such a weight and will also prescribe the weight per inch width of tire and make other regulations as to division of load between forward and rear axles.

Changes in the Cost of Living Since 1914

THE National Industrial Conference Board, New York, has issued another report on cost of living, based on its own figures for retail prices of clothing, furnishings and fuel and the index numbers of the United States Bureau of Labor Statistics with regard to food.

The total increase in the cost of living from the beginning of the war to March, 1921, the investigation shows, was 68.7 per cent. The rise in the cost of the major items of the budget of wage earners between July, 1914, and March, 1921, is estimated to have been as follows: Food, 56 per cent; shelter, 71 per cent; clothing, 74 per cent; fuel and light, 87 per cent; sundries, 85 per cent.

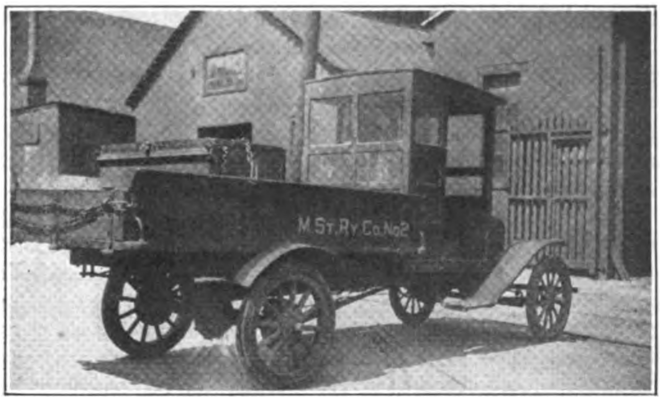
Since July, 1920, the total cost of living has decreased 17.5 per cent. Food has decreased 29 per cent, clothing 35 per cent, while shelter has increased 8 per cent and fuel and light 13 per cent, no change having taken place in the cost of sundries.

Since the beginning of last November the total cost of living has decreased 12.6 per cent, food showing a 19 per cent decrease, clothing a 23 per cent decrease, fuel and light a 6.5 per cent decrease and sundries a 4 per cent decrease.

Electrified Track Switches

WHEN a railway system has more than 40 miles of track and operates between sixty and seventy cars it is either fortunate or very capable in being able to route its cars so that there are only eight switches on the entire system which have to be used in normal operation. Such, however, is the situation on the Little Rock Railway & Electric Company's system in Little Rock, Ark.

Of these eight switches, two have been electrically operated for some time and four are now being equipped with Cheatham switches. The other two may also be equipped in the near future. The management believes, even with the small number of switches it has to operate, that it pays to use electric switches both from a time-saving and a safety standpoint.



THE MONEY BOX IS CHAINED TO THE CHASSIS OF THE TRUCK

Memphis Cash Wagon Defies Hold-Ups

Ford Truck with Triple Locked Strong Box Used to Carry Daily Receipts to Bank, Some Distance Away, in Memphis—Saves Money Over Previous Method of Handling

ACCOMPANYING illustrations give a good idea of the method now employed by the Memphis Street Railway to transfer its daily receipts from the company's headquarters to the bank. As noted, the cash wagon consists of a Ford chassis with a specially constructed heavy truck body, on which truck is placed a very heavy two-compartment iron box built from boiler plate. This iron box is chained to the truck by a heavy log chain, which is securely padlocked to the sides of the chassis. The box has a lower and an upper compartment, each of which is equipped with an iron door, which is padlocked shut. The actual cash is placed in smaller iron box containers about 8 in. x 12 in. x 16 in., which are also padlocked shut. These latter containers are equipped with a sort of harness or carrying hammock with handles so that two men can easily carry one of them.

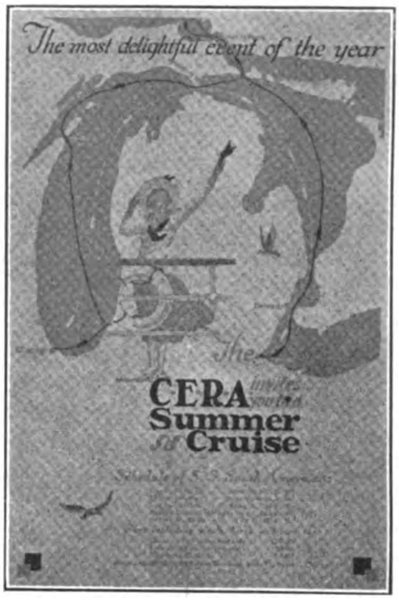
When the truck is loaded with its daily receipts, all padlocks are locked and keys are left in the cashier's office. Three men accompany the truck on its trip to the bank, some distance away from the office, which is at the carhouse out on the system. Another set of keys is kept at the bank, so that the men on the wagon do not have any keys to any of the locks.

The former method of handling this transfer of cash daily in Memphis was to have two men assigned to each of these small iron cash boxes, the whole group of men being sent to town on a special street car. This was naturally not economical in the use of men's time, for ten boxes needed twenty men to transport them. The company figured that there is a saving of at least $3 a day by the present method over the former one.

All Aboard for the C. E. R. A. Summer Cruise

THE Central Electric Railway Association committee on arrangements is trying some publicity within the industry in connection with its summer cruise. The accompanying illustration shows one of its 5-in. x 8-in. poster cards announcing the schedule of the SS. *South American*, which leaves Chicago at 8:30 a.m. on July 26, leaves Toledo on the return trip at 10 a.m. on July 28 and arrives at Chicago at 1 p.m. on Aug. 1.

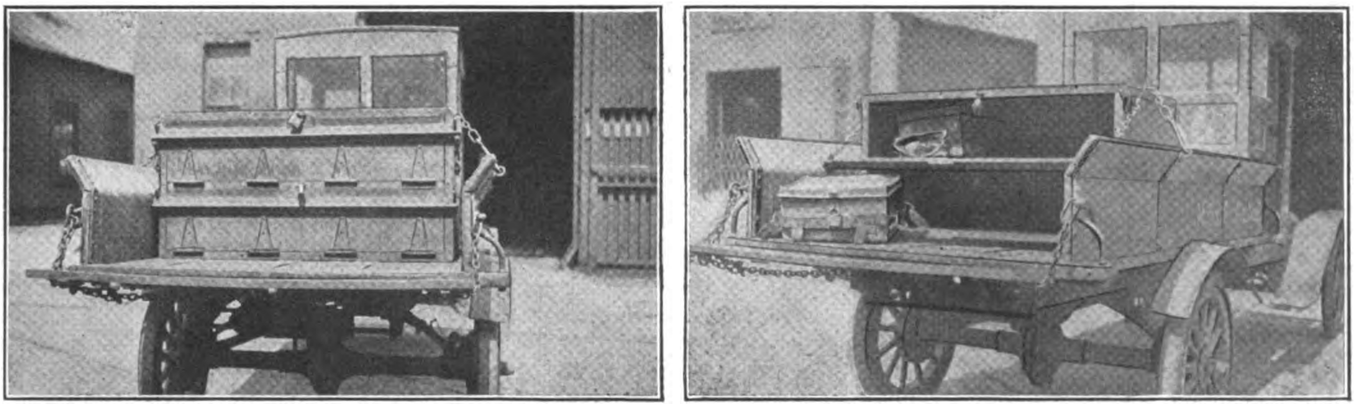
On the reverse side of this card is a long list of names signed under the motto "We will see you on the boat." The Central Electric Railway Association wants all railway men to take advantage of this summer cruise, the ladies also being welcome. A good program is promised. Reservations are in the hands of John Benham, secretary of the association, 15 South Throop Street, Chicago, Ill.


The most delightful event of the year
The CERA
Summer Cruise

C. E. R. A. POSTER

"Movie" as Publicity Agent

Many stockholders of the Chicago Railway Equipment Company and their friends were guests of the company recently at an educational film show given at the Woman's Club in St. Louis. More than 6,000 feet of film descriptive of the company's activities made up a portion of the serious part of the entertainment. Originally the company began in St. Louis with one plant, started in 1888. It now has headquarters in Chicago and five subsidiary plants in the East. E. B. Leigh, president of the company, presided and explained the motion pictures.



TWO VIEWS OF THE MEMPHIS CASH WAGON, SHOWING VARIOUS DETAILS

Simple Inspection Method and Record for Small Shop

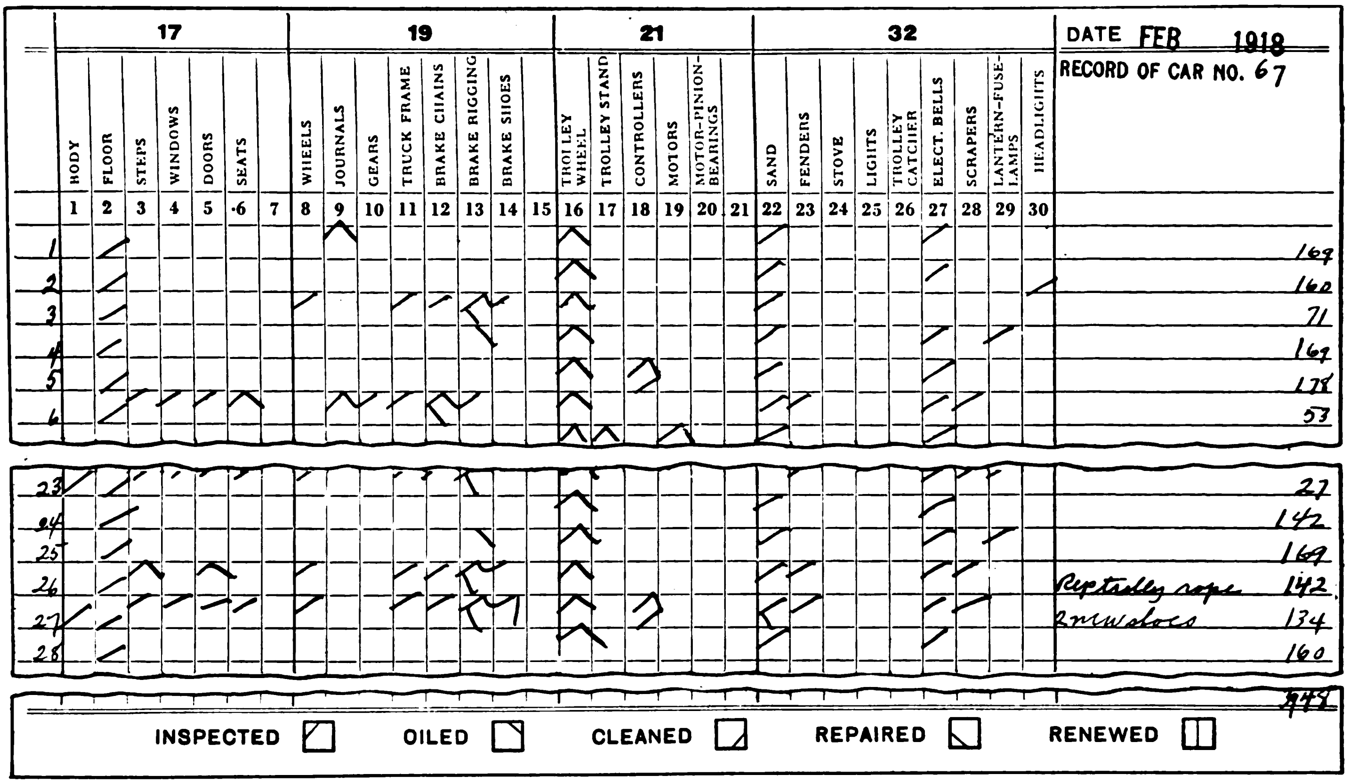
Adequate System of Keeping Inspection Records Used by the Madison (Wis.) Railways Reduces Amount of Writing or Clerical Work to a Minimum and Without Burdening the Files

A VERY simple though adequate system of keeping the inspection records is used by the Madison (Wis.) Railways. The condition of each car is reported by the motorman who brings it in, and this report is checked by the shop foreman. Most of the trouble reported is taken care of by the night foreman, who also arranges to keep the bad-order cars in the shop during the following day, reporting their condition to the master mechanic. Outside of bad-order reports, the cars are taken in for inspection, adjustment or overhaul in rotation, depending on the mileage operated and the lapse of time since the last inspection. The period of inspection is left to the discretion of the master mechanic, who has full knowledge of every condition.

Owing to the small size of the shop the company does not make use of a printed form of shop order, the master mechanic simply making a pencil report of cars to be inspected and for what cause.

The record system on the inspection work is kept on a 9¾-in. x 11-in. card having the divisions of the inspection work printed across the top of the card, together with the account numbers for the several groups, and a key to the inspection record marking at the bottom. Any work done on any car, whether by order or not, is recorded on one of these cards, opposite the car number written in the column at the left-hand margin. A card made up in this manner, with the numbers of all of the cars on which work has been done appearing in the left-hand column, is used each day and turned in to the master mechanic. This record of work done on all cars for the day is then transcribed in the office on an identical card made out individually for each car for the permanent record file. On this the numbers 1 to 30, representing the days of the month, are written in the left-hand column instead of car numbers.

Each card as made up in the form reproduced herewith thus shows at a glance the inspection record for the month of a certain car, the number of which appears in the upper right-hand corner. Thus by inserting in the left-hand column the numbers of cars on which work is done, or the days of the month, the card becomes a record of the inspection for the day on all cars or the inspection for the month on one car. The simple straight-mark system for recording the kind of inspection done reduces the amount of writing or clerical work for the shop man to the minimum. The monthly record for each car gives a sufficiently complete record without too much clerical work and without burdening the files.



17							19								21						32								
BODY	FLOOR	STEPS	WINDOWS	DOORS	SEATS		WHEELS	JOURNALS	GEARS	TRUCK FRAME	BRAKE CHAINS	BRAKE RIGGING	BRAKE SHOES		TROLLEY WHEEL	TROLLEY STAND	CONTROLLERS	MOTORS	MOTOR-PINION-BEARINGS		SAND	FENDERS	STOVE	LIGHTS	TROLLEY CATCHER	ELECT. BELLS	SCRAPERS	LANTERN-FUSE-LAMPS	HEADLIGHTS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

DATE FEB 1918

RECORD OF CAR NO. 67

1		169
2		160
3		71
4		169
5		178
6		53
23		27
24		142
25		169
26	Rep trolley rope	142
27	2 new shoes	134
28		160
		449

INSPECTED ☐ OILED ☐ CLEANED ☐ REPAIRED ☐ RENEWED ☐

INSPECTION HISTORY OF ONE CAR FOR ONE MONTH AS KEPT BY MADISON RAILWAYS

New Insulating Varnish

A BLACK insulating varnish, characterized as "General Utility Inco Insulite No. 16," has recently been placed on the market by the International Paint Corporation of St. Louis, Mo. After baking, this varnish produces a hard, semi-flexible, jet-black lustrous coat, possessing a high dielectric strength and electrical resistance, excellent binding and cementing qualities, and practically moisture, acid and alkaline proof. It will air-dry in thin films in from two to four hours at room temperature. When air-dried it produces a semi-gloss black coat more flexible than when baked. It does not, however, have as high dielectric or mechanical strength or as high electrical resistance as when it is baked.

Old Ties Make Good Fence Posts

IN SOME of the recent track reconstruction work in Atlanta it was necessary to take out some old ties, most of which had been gained down by the rail, but were in good condition chemically and physically. Most of these ties have been in the ground for more than twenty years without suffering anything else than physical wear.

Not wishing to scrap good wood like this, it was found that these ties could be made into very good fence posts used for blocking, and these uses have been made of most of the ties removed.

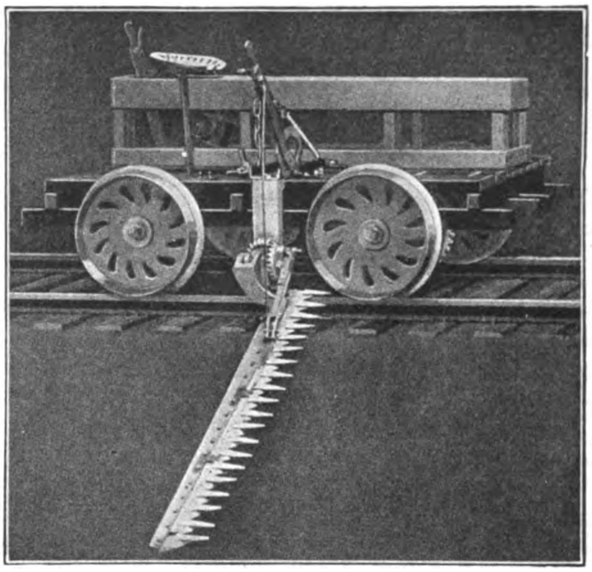
Magnetic Grounding Block

A DEVICE has been developed in England for the purpose of making a good temporary earth or ground connection for track welding and other purposes. It consists of a substantial electro-magnet, provided with carrying handles, the winding being energized with current drawn from the rail. The attraction between the magnet and the rail provides a firm electrical contact between it and the terminal of the electric winding. The device is made by the Equipment & Engineering Company, London.

Mowing the Weeds Along the Tracks

A TRACK mower consisting of an ordinary cutter bar, sickle and driving mechanism which may be attached to any motor, hand or push car and operated by the section men has been placed on the market by the Rawls Machine & Manufacturing Company of Chicago. This mowing device enables the maintenance men to keep the right-of-way well cropped of weeds along either side of the track throughout the summer at a small expense. A cutter bar and sickle from 5 to 7 ft. long is used and is said to negotiate irregularities in the ground without any trouble. The position of the cutter bar is controlled by a hand lever on the car and handled by one man. It is claimed that grass and weeds may be mowed while the car is driven at a speed of 7 or 8 miles per hour. If any obstruction is seen the sickle can be raised to pass over it, and should the obstruction be overlooked there is an automatic feature which protects the sickle from breakage.

The advantage of this device in sections where the grass and weeds grow rank and high along the side of the track and lop over the rails, making them slippery and dangerous and reducing the normal tractive effort available, is obvious. It is claimed for this track mower that it not only leaves the cut surface smoother than is possible with a hand scythe but it distributes the cut grass and vegetation evenly so that after it has dried the whole surface may be burned over, thus destroying in large measure the stubs and roots beneath and damaging the grass beyond the swathe of the mower.

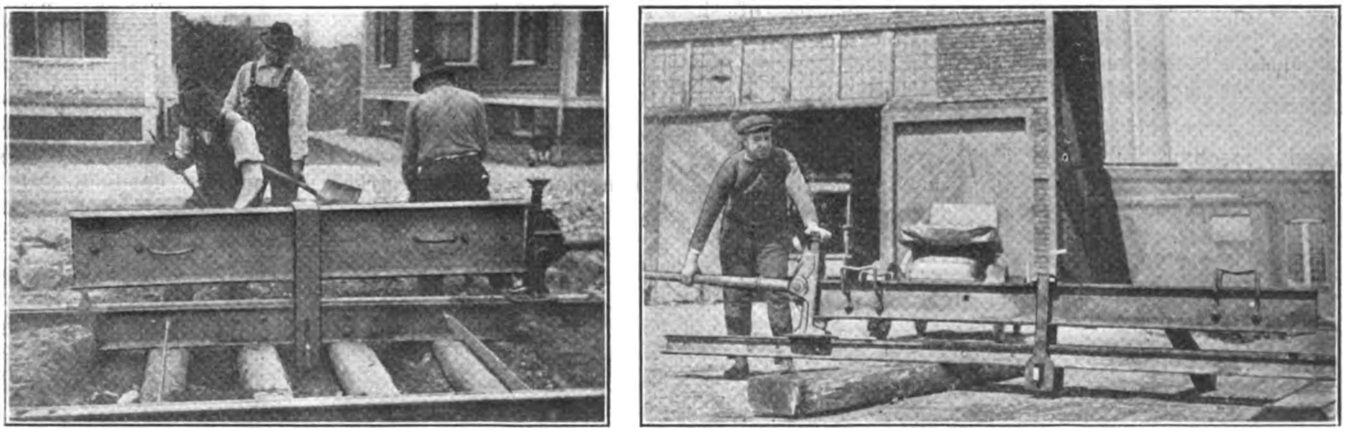


TRACK MOWER ATTACHED TO SPEEDER

Vertical Rail Benders

AN ACCOUNT was published on page 809 of the issue of this paper for April 30 of the device used by the Eastern Massachusetts Street Railway for bending up the ends of rails at low joints. Two sizes of benders are used. One is made up of a 15-in. I-beam and is used for heavy work, such as with a 9-in. 104-lb. girder rail. The jack used with this bender is of 30 tons capacity, and a line drawing of this bender was given in the article mentioned. In addition the company has a lighter bender, made up of a 9-in. girder rail and used with T-rails up to 75 lb. in weight. This is also a home-made device.

Through the courtesy of Frank B. Walker, engineer maintenance of way of the company, illustrations of both of these benders in use are given herewith.



AT LEFT, FIFTEEN-INCH VERTICAL RAIL BENDER IN USE. AT RIGHT, NINE-INCH RAIL BENDER USED WITH LIGHT RAILS

Association News

Another View of the Coal Situation

J. W. LIEB, Jr., chairman of the fuel supply committee of the Joint Committee of National Utility Associations, which represents the American Gas Association, the National Electric Light Association and American Electric Railway Association, has received from George Otis Smith, Director of the United States Geological Survey, a letter on the coal situation which is of particular interest to electric railway men. Mr. Otis answers certain questions asked by Mr. Lieb, giving the benefit of the Geological Survey's statistical stock-taking as to coal. He urged the importance of stabilizing the coal market, and stated that April 1 data showed the public utilities to be in a strong position regarding stocks of coal. Continuing he wrote, in part, as follows:

> At the present rate of consumption the electric utilities canvassed had on hand as of April 1 a supply sufficient for six weeks, six days' operation, and for the coal-gas plants the supply was enough for nine weeks, three days. As to what the public utilities have been doing since April 1 we have no knowledge. It is clear, however, that consumers as a whole have depleted further their reserves. The country is still coasting on its reserves.
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> Clearly the public utility operator has everything to gain and nothing to lose by continuing to maintain his reserves. It is increasingly plain that the condition of consumers' stocks has a very profound bearing on the coal market. When a man has a large stock he can wait for favorable terms. When his stock is small he has to buy. If something happens to interrupt the orderly flow of coal from mine to place of use he has to buy emergency coal. Now when stocks are generally low a sudden interruption to supply—a blizzard, a switchmen's strike, a traffic jam—finds many consumers unprepared and drives them to enter the spot market. That is the time when a well-stocked coal bin pays for itself. The plant is equipped to withstand a siege.
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> We do not know enough about stocks as yet to be quite sure what constitutes a safe supply, but if we are willing to learn from experience we can hardly escape the conclusion that a stock of less than 30.000 000 tons is not sufficient to meet a severe winter with business active. The country entered the winters of 1916-17 and 1917-18 with about 28,000,000 tons in storage and in neither winter was the lot of the coal consumer a happy one. Again in the summer of 1920, when stocks fell to 20,000,000 tons, a runaway market developed. On the other hand, in normal times a stock of above 40,000,000 tons seems to be sufficient and it is significant that the coal market did not tranquillize itself in 1920 until the above-ground reserve passed that figure. A difference of ten or fifteen million tons, the margin between a safe reserve and an unsafe reserve, does not appear much; it is no more than a week's production at the maximum rate. In fact, however, this small amount is great enough to change the tone of the market.
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> There is a sort of critical level of stocks—a critical anchor-ice temperature, to borrow a phrase from hydroelectric operation. Exactly what the critical level is we cannot say until we have been keeping records longer, and of course it would be lower at a time like the present with business depressed and consumption low than in a time of active business. But we can say, I think, that the critical level lies somewhere between 30,000,000 and 40,000,000 tons; and that when stocks are much above that level we have a "buyers' market." Let them fall much below it and we have a "sellers' market."
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> As to the present level of stocks the Geological Survey's inventory showed that on Jan. 1, 1921, it was not more than 48,000,000 and not less than 42,000,000, say about 45,000,000 tons. By April 1 stocks had dropped to somewhere near 37,000,000 tons, and since then they have doubtless decreased further. In other words, while we can tell from the tone of the market that the critical level has not yet been touched, it is plain that stocks are fast approaching it, and that it would be unwise from the consumer's point of view to let them sink much lower.
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> The question as to the danger of a congestion of transportation should the public long delay the purchase of coal has been answered by the railroads themselves. If business does not revive and we continue to burn coal only at the present rate there is no reason to fear car shortage; for consumption is much below the pre-war level, and prior to the war our transportation system had no serious difficulty in handling the coal offered, even with the peaks and valleys of seasonal variation in demand. In those days, however, the country needed less than 500,000.000 tons of soft coal a year. Now our requirements, with business reasonably active, are in the neighborhood of 530,000,000 tons. There has been no corresponding growth in the capacity of the railroads to transport coal, and on the three occasions when we have called upon them to haul 550,000,000 tons of soft coal in a single year the carriers have shown signs of distress. In 1917, 1918, and again in 1920, years in which the output of bituminous coal exceeded 550,000,000 tons, the carriers were able to handle the burden only by being relieved from the responsibility of carrying other types of traffic. As Mr. Gutheim, of the American Railway Association, has pointed out, "Our railroad facilities are probably adequate today to handle our necessary annual bituminous output, if produced with fair uniformity of rate throughout the year, and will certainly be adequate when post-war rehabilitation of the properties is completed. Our railroad facilities are not and without great waste of investment never can be adequate to handle currently our necessary bituminous coal production when obtained by weekly peaks of 13,000,000 tons and valleys of 7,500,000 tons in a 12-month period, as has been the case in the past two years." If Mr. Gutheim is right the need for buying early and taking coal while it can be had will be with us for some time.
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> But what, it may be asked, is the use of a public utility storing coal when other consumers are not? How can the tonnage stored by even all the public utilities stabilize the market if other consumers are holding off and burning up their reserves? The answer is that a reserve is never likely to be needed so much as when other people have none.
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> To offset this sense of security which comes from a large reserve what can the public utility manager gain by delay? To the layman it would appear that no time could be so favorable to bargain as now, when the coal industry is seeking a market for its output. There are three important elements in the cost of coal laid down at the consumer's door which may conceivably change before long—the wage scale, the freight rate, and the operator's margin. So far as the first two are concerned the purchaser should get the benefit on all coal delivered after the reduction. So far as the third element is concerned the public utility must decide whether the coal man is likely to accept any smaller margin later when demand is active than now when the market is dead.
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> With adequate stocks, however, the public utility is and will be in a strong position to buy whatever the level of costs and whatever the market position of other consumers. The public utility cannot shut down, and the public must pay for the coal the public utility buys, hence from the public standpoint the double function of large stocks: to keep up service and to keep down prices.

Joint Meeting at Hartford

A SUCCESSFUL meeting of the Connecticut Company section of the American Electric Railway Association was held jointly with the New England Street Railway Club at Hartford on May 18. This was the thirty-ninth monthly meeting. Among the speakers were I. A. May, comptroller the Connecticut Company; E. Irvine Rudd, engineer Connecticut Public Utilities Commission; N. J. Scott, manager Hartford Division Connecticut Company; Edward Dana, president New England Street Railway Club and general manager Boston Elevated; W. J. Flickinger, vice-president Connecticut Section New England Street Railway Club and assistant to the president the Connecticut Company; Richard E. Higgins, chairman Connecticut Public Utilities Commission, and L. S. Storrs, president the Connecticut Company. The general features of the joint meeting were reported fully in the issue of the ELECTRIC RAILWAY JOURNAL for May 21.

Owing to a reduction in printing costs the association office can now supply the booklet "How You Used to Ride" at $7.50 per thousand copies. This is the cost price, and the price may be still further reduced if the demand warrants.

Letters to the Editors

Maintenance Cost on a Car-Weight Basis

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., May 28, 1921.

To the Editors:

David Harum said "a reasonable amount of fleas is good for a dog"; so a reasonable debate on the effect of car weight on track maintenance may not be out of place. The article by J. C. Thirlwall in the April 16 issue of the JOURNAL and subsequent correspondence has created no little interest among track engineers. In the article in the issue for April 30 Mr. Thirlwall evidently does not differentiate his estimated track maintenance costs between city and interurban properties. There is a wide range in maintenance of tracks in these two situations, and in city tracks where paved about 35 per cent of the maintenance cost is for pavements.

The safety car is used almost exclusively in cities where the tracks are paved. Meanwhile there is a large percentage of the pavement maintenance cost which is due solely to the wear and disintegration of the pavement. These are not caused by the passage of the car, no matter of what type it may be, but are only due to use by public vehicles.

As Mr. Thirlwall says, "engineers will disagree as to the effect of car weight on track maintenance," and I venture to be one of the "disagreers." We do not have sufficient cost data to enable us to determine what it costs to maintain our tracks now, whatever the equipment may be, and I wish to be in opposition to the use of estimates unless the latter have more and better records of actual costs upon which to base estimates of the influence of car weight.

The safety car will continue to sell itself to the railway companies without need for using supposed lessening of track maintenance as an argument. Further, the writer believes that the actual axle load, plus impact, as found with the safety car, does not fall very much below that of other equipment which must be provided for in our tracks and the increase in use of safety cars adds more wheels which pass over the tracks through increased frequency of service. The number of lighter wheel loads, if increased over normal, may do as much total damage to rails and joints as the normal number of heavier loads.

It has also been commonly observed on all older properties which have long used a fairly heavy double-truck car that it is costing a great deal of money to make the "double-truck track" suitable for the single-truck car. A higher degree of maintenance is called for with single-truck cars and is being paid for right now. Until we know just how much it is costing us to maintain a track almost as smooth as a billiard table, we shall be uncertain that the safety car is saving any money on track maintenance.

R. C. CRAM,
Engineer of Surface Roadway.

A Smile and Credit

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., May 24, 1921.

To the Editors:

What a man wants from his grocer during this period of high cost of living is a smile and credit. Also that is exactly what the street railways want.

Hardly a man will deny that what he wants most nowadays anyway is "a smile." Applied to the street railway situation a smile means the good will of the public and no effort should be spared by officers or by employees in obtaining this good will. It is the most valuable asset a street railway can have and by a proper education of the conductors and motormen the good-will account can be increased to a large extent. One harsh word by a conductor may perhaps make an enemy of one of the road's best customers and booster. A good illustration is given in the following:

> "A BANK TELLER'S UNRULY TONGUE"
>
> An old and shabbily dressed man in the line at the receiving teller's window of a certain Chicago bank fumbled for some papers.
>
> "For heaven's sake, hurry up!" snapped the teller.
>
> The old man's eyes flared, he emitted a grunt of anger and left the line without making a deposit.
>
> Twenty minutes later the teller was called into the cashier's office and told his services would be required no longer than the end of the week. He asked for an explanation and got it. The old fellow in the shabby clothes happened to be the head of one of the largest lumber companies in the Middle West—an organization that kept all of its checking accounts in that bank. He had dropped in to make a deposit and open a personal checking account. The amount he intended to deposit was large—the annual dividends from several of his organizations!
>
> After his discourteous treatment by the teller, he had gone to the cashier, and not only refused to have his personal account in the bank, but he had hinted also that his lumber company might withdraw its balance from the bank. The cashier was forced to rid the bank of an undesirable employee who had let his frosty tongue spoil all of his other desirable qualities from the point of view of that banking establishment.
>
> HARRY BOTSFORD, in *Leslie's*.

As for credit, the street railway officials have also forgotten what the word means, but the future is bright and I believe the public begins to realize that it cannot do without the street railways and that it will help to restore credit and thus give a new lease of life to the transportation systems of the country.

With the relief being granted by many legislatures from the unfair burdens of the past and with the riding public paying just fares, the street railways will be restored to a proper credit basis and will give the riding public the service it requires. Let's all vote for a Smile and Credit.

I. A. MAY, Comptroller.

Membership List of International Railway Association

THE International Railway Association, formerly the International Railway Congress, an international organization of steam railroads, has just issued a pamphlet giving a list of members, program for the Rome meeting to be held April 18 to May 1, 1922, index of topics discussed since the association was organized and a brief résumé of recent events.

Recent Happenings in Great Britain

All England Has Been Organized on War-Time Basis to Combat Domination by Coal Miners

(From Our Regular Correspondent)

Unfortunately for the industrial peace in this country, there is a body calling itself the triple alliance. It is a combine for common action of three national trade unions or federations of trade unions, namely, coal miners, railway men and transport workers (the latter including all sorts of transport employees except railway men). The transport workers thus embrace all tramway and omnibus employees, drivers of automobile and horse commercial vehicles, etc., but in this country the word railway does not include street tramway.

EARLY in the present year Parliament, at the instance of the Government, passed an act abolishing all state control of coal mining industry, which had been in operation since the beginning of the war and which otherwise would have continued until Aug. 31. The inflated wages of the miners under state control had to go, and when the mine owners issued new scales of wages, reduced to put the industry on an economic basis—the Government subsidiary being removed—the miners struck in the beginning of April and demanded a national wage board and a national pool of profits so that miners in all districts, rich and poor, would be paid at the same rate.

This action was resisted both by the owners and the Government, but the miners hoped to get the other two sections of the triple alliance to go on strike in sympathy. They announced that they would strike, but at the last minute, on April 15, the two affiliated bodies determined that their men should remain at work. The reasons advanced were that the miners had got a good offer for negotiation, and that the rank and file of railway men and transport workers would in a large proportion of cases refuse to go on strike.

NATIONAL STRIKE AVERTED

Something like a national strike was thus averted. The Government had all preparations made for carrying on transport by road, and the army reserves were called out and a defense force organized for maintaining order. Large bodies of tramway men in different parts of the country had resolved to join in the strike before the counter-order from the transport workers' executive was issued.

During April prolonged negotiations went on between the Government, mine owners, and the miners, and the Government offered a subsidiary of £10,000,000 to help to keep wages up during the ensuing four months of transition. The miners, however, refused all offers, and simply adhered to the demand for a national pool of profits, meaning nationalization. As Parliament had already decided against nationalization the Government persisted in refusing the miners' demand, which was now generally recognized as a political one and having nothing to do with wages.

At the end of April, accordingly, all negotiations were broken off, and the nation settled down to a struggle of endurance. War conditions of economy were restored. Manufacturing industries were largely shut down for lack of coal, unemployment went up by leaps and bounds, and railway and tramway services underwent a series of successive curtailments. The Government, however, arranged that all public utility services should have a preference in the matter of coal supplies. For domestic purposes coal was rationed and supplies frequently cut off.

With the month of May the reductions in public services continued. Further trouble arose when the executives of transport workers and of the railway men issued orders that the members of these bodies were not to handle imported coal, which was now arriving in considerable quantities. Volunteers and non-union labor were engaged for the work. Meanwhile an important step was taken at several electric generating stations in the country; namely, the adopting of furnaces for oil burning. This was notably the case at Chelsea, the biggest traction power station in the country, which supplies power for the London underground railways. There twenty-four out of the sixty boilers were converted so as to begin operation with oil fuel in the middle of May. Fuel oil supplies are reported to be plentiful, and the change is likely to be permanent.

While town councils in Great Britain have for many years been authorized to own and work tramways and do so in all the large and in some of the smaller towns county councils have not been granted the same privilege. In only comparatively few cases, indeed, is there a field for county councils in this direction, owing to sparseness of population in rural areas and owing to town councils being empowered to operate beyond their boundaries where suburban or interurban population is very dense.

In this connection the London County Council, which works tramways, is a case by itself, for the county of London—all urban—is only a county for certain general administrative purposes. Some years ago the Middlesex and the Hertfordshire County Councils were authorized to construct tramways, but these were leased for operation to a private company. This spring a bold bid for a new departure was made by Durham County Council which applied to Parliament for power to build and work 27 miles of interurban tramways in the county, to provide and work trackless trolley vehicles on 60 miles of route, and to run omnibuses on any road in the county. The cost of construction and equipment was to be about £1,700,000.

Objection was raised to the establishment of this precedent and to the heavy capital expenditure by a local authority at the present time. It was also maintained that financial loss would result which would have to be met by the ratepayers, and that the scheme was superfluous because private enterprise already provided omnibus services over all except 4 miles of the routes covered by the scheme. Competition with the North Eastern Railway, which pays 12½ per cent of the whole county rates, was also urged. When the bill came before the House of Commons on April 14 it was after discussion rejected by 112 votes against 46.

L. C. C. TRAMWAYS BEHIND

No more disastrous example of the result of high wages and high cost of materials in this country can be found than the case of the London County Council Tramways. The working of the undertaking, which carries more passengers than any other tramway system in this country, resulted in a loss for the financial year ended March 31 last of no less than £540,000. The expenditure debited includes some capital charges, but only half the cost of renewals. Even before the war the system was never a great financial success, largely because of the heavy capital charges for interest and sinking fund on the high cost of the conduit system which for the most part is used. The last increase of fares has greatly increased the receipts, but the higher revenue has proved quite inadequate to meet the growing expenses. The ratepayers are to be charged 1d. in £1 to help to meet the deficiency.

Arthur Watson, general manager of the London & North Western and the Lancashire & Yorkshire Railway Companies, lecturing to the Manchester Statistical Society in April, put forward the view of the most useful development in the methods of transportation would be the electrification of the railways. Restrictive legislation had, however, been passed to such an extent as to interfere with the fundamental principle on which the railway system had been organized; namely, that they were commercial undertakings. Unless reasonable dividends were realized railway enterprise must come to a standstill. Without such dividends it would be impossible to contemplate a large expenditure on the electrification of lines. The capacity of the railways would be enormously increased by the use of electric traction. The country was on the threshold of great electrical development, and the electrification of railways would give a great stimulus to a national system of electrical power production. These opinions of Mr. Watson are quoted as being of special importance, seeing that he is manager of a great railway undertaking.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Publicity Effective

St. Louis Road Succeeds in Driving Home Need for More Liberal Treatment

Publicity relating to the financial problems of the United Railways, St. Louis, Mo., is bearing fruit. Civic organizations in five suburban subdivisions of the city will go before the Missouri Public Service Commission and request that the receiver be permitted to charge an 8-cent fare instead of a 7-cent fare, in order that credit shall be restored and funds obtained to extend several lines.

A recent statement of Receiver Wells made an impression. He said that the fare reduction last year from 8 cents cash, or two tokens on the cars for 15 cents, seven tokens for 50 cents or 50 for $3.50 at drug stores to a flat 7-cent fare meant an actual reduction of only 37/100 of a cent in fare and yet caused a falling off of about $3,000 a day in the receipts.

To various bodies of citizens clamoring for extensions of service the receiver has made it plain that the only way to get improvements is to increase the revenue and insure a surplus instead of a deficit. The first three months of this year showed earnings of about $200,000 less than enough to pay interest charges and operating expenses. Travel has increased slightly the last two months, but the receiver says that if wages are not cut after June 1, when the present contract with the trainmen expires, an increased fare will be necessary.

Conferences are in progress between the men's union and the management over the proposed new wage contract. Motormen and conductors now are getting 55 cents an hour the first six months, 60 cents thereafter until the end of the second year, and 65 cents an hour after two years, with time and a half for overtime based on a nine-hour day. A special effort will be made to modify the working conditions which the management considers a hardship.

The Missouri Supreme Court recently denied the application of the receiver for a mandamus to compel the State Public Service Commission to arbitrate a wage dispute. This arose in the case of the shopmen, electricians, printers and others not belonging to the carmen's union. The court held it was optional with the commission as to whether they should serve as arbitrators. The commission had refused to act in the matter of the shopmen, and whether they will refuse again in case the carmen's claims go to arbitration is not yet known definitely.

In the meantime the receiver and the manager, Col. A. T. Perkins, have met with various civic organizations to explain the situation, and one of the results is the decision by some of these bodies to support rather than oppose an expected application for increased fare. In one of his statements Receiver Wells brought out the new thought that under the changed condition of utility regulation the users of public utilities must be prepared to pay full value for service.

Threatened Strike Postponed

No agreement regarding wages had been reached on May 31 by trainmen and the Pennsylvania-Ohio Electric Company, Youngstown Municipal Railway and associated companies at Youngstown, Ohio. On that day at midnight the agreement expired, but operation of cars will continue and negotiations proceed at least for a day or two longer. The expiring scale is 60 cents for the first three months, 63 cents for the next nine months and 68 cents thereafter. The company originally offered 45, 48 and 50 cents, and the men after several weeks of negotiations offered to take 52, 55 and 60 cents. The company subsequently proposed a scale calling for 46, 50 and 53 cents. This was the status on May 31.

Utility Act May Strike Snag

The lower house of the Illinois State Legislature on May 25 approved the new public utilities act by a vote of 100 to 23. The bill struck a snag, however, when it was sent to the Senate and a warm fight is promised before its fate is determined.

The proposed law changes the name of the regulating body to "Illinois Commerce Commission." If it passes, the five commissioners on the present body will be succeeded by seven commissioners and eight assistant commissioners, to be appointed by the Governor for a term of four years.

It is said that the bill would remove all civil service safeguards. Communities would have the right to remove themselves from the jurisdiction of the commission and adopt home rule by public referendum. The proposed act has been denounced by various interests including the Western Society of Engineers.

A resolution has been introduced in the Legislature requesting the Governor to prevail on the commission to force a return of the 5-cent fare on the Chicago surface lines. It has been said that this is not favored by Mayor Thompson of Chicago who is looking for the approval of his plan for people's ownership of the traction lines and a 5-cent fare supported by tax provisions.

Des Moines Service Cut

Last Hour Struggle by Business Interests of the City to Preserve Railway to the Community

Following authority granted by Federal Judge Martin J. Wade the General Electric Company, which holds claims against the railway for material supplied, has started removing its equipment from the substations of the Des Moines City Railway with the result that on May 23 the railway officials were forced to cut service 62 per cent of what has been given during the last three months.

As a result the company operated only forty-nine cars from Monday night until Saturday morning when seventeen more cars were placed in service bringing the service up to what was approximately 50 per cent of normal.

Business interests of the city held meetings during the week to discuss ways and means of bringing about a settlement of the railway difficulties. The Greater Des Moines Committee and the Chamber of Commerce appointed a committee to draw a service-at-cost franchise which it is hoped will serve as a basis of bringing about a settlement of the trouble. This committee has since called into conference Judge W. E. Miller, the newly appointed Corporation Counsel to assist it.

Hope is entertained by members of the two organizations fostering the new franchise proposal that if a favorable franchise can be secured arrangements may be made between the Des Moines City Railway and the General Electric Company which will permit the substation to be restored.

F. C. Chambers, operating receiver, and J. G. Gamble, attorney for the railway, have been in Chicago conferring with the Harris interests relative to foreclosure of the mortgage.

According to a Des Moines newspaper the McKinley interests of Illinois, operating the Des Moines Electric Company, have made a proposition for the purchase of the Des Moines plant.

The statement for April filed with the City Council by the railway shows that the company lost $35,000, a considerable increase over March.

Pending the settlement of the curtailment in the service, negotiations between the company and its union employees over the wage question are at a standstill. As yet the two arbiters chosen by the company and the men have been unable to agree upon a third man. A week ago they settled upon Judge F. F. Faville, of the Iowa Supreme Court, but he was forced to decline. Sidney Mandlebaum was later agreed upon for the third man, but he, too, refused to serve.

Four Months' Labor Battle

Railway at Albany Refuses to Compromise a Strike Issue that It Considers Clear Cut

Renewed attention has been directed to the strike of the employees of the United Traction Company, Albany, N. Y., by the recent disorder there, after a period of comparative quiet. The strike was declared on Jan. 28. The economic readjustment had not yet fully set in at the time, and the men, loath to accept a wage cut, decided to go out in a test of strength in contravention of their contract. In consequence Albany and the entire surrounding communities were thrown into turmoil.

THE pay of the men was increased last July from 45 cents to 60 cents an hour to continue to June 30, 1921, provided the company was allowed the right by the Public Service Commission to increase its rate of fare before Nov. 1, 1920, from 7 cents to 10 cents. The commission did not act upon the application until January, when it granted an increase of fare in Albany from 7 to 8 cents and ordered a decrease in fare in accordance with city franchises in Troy and Rensselaer. The company claims that the net result of the order was an actual reduction in revenue and that it was forced to put the men back on the 45 cents an hour pay to prevent bankruptcy. The company officials insist that the men understood that would be done under the provision in the contract that a general increase in fare be granted before Nov. 1 as a condition for a continuance of the 60 cents an hour pay.

Shortly after the declaration of the strike the company claimed:

> 1. That under the conditions of operation, wages, prices of material, and rates of fare, it had in six years sustained a loss of $923,522.
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> 2. That under the decision of the Public Service Commission, effective on Jan. 29, 1921, it estimated its loss for one year, if the rates of pay for motormen were continued at 60 cents an hour (others in proportion), would be $743,974, and that at the rate of pay of 45 cents an hour, the proposed new rate, its loss for one year would be $229,096.
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> 3. That the contract between the company and the Amalgamated Association, so far as it covered wages, was ended as of Nov. 1, by the findings in the decision of the Public Service Commission.

Neither the first nor the second of these statements was ever challenged. With respect to the third statement, the Public Service Commission itself said:

> That contract (of July 1, 1920,) fixed the wages until Nov. 1, 1920, "with the understanding that said rates of wages are to continue until June 30, 1921, provided the company is granted permission to charge increased rates on or before Nov. 1, 1920." No such permission has been granted, so that there is now no contract covering wages.

The men stuck to their guns, so to speak. Through Supreme Court Justice Howard an order was secured directing that the issues, raised in the application of the union for an order directing the company to proceed to arbitrate the differences, be submitted to a jury. This order was reversed by the Appellate Division, Third Department, on May 17. The decision dismissed the entire proceedings and held that the striking carmen had no claim to arbitration under the contract involved except as to wages for the year beginning June 30 next. The court also held that the members of the unions "abandoned the contract and committed an anticipatory break of the provision for arbitration by destroying its consideration before it had an opportunity to come into operation." Said the court:

> When, on Jan. 28, 1921, the employees of the Traction Company, members of the petitioners' unincorporated association, left their employment, leaving the traction company incapable of immediate performance of its obligations to the public, they committed a breach of the contract, and if there had been a valid agreement for an arbitration of all controversies, they would have relieved the traction company of the obligation to perform. . . The provision for arbitration is limited. . . This agreement relates wholly to an adjustment of wages for a period succeeding the term of the contract (June 30, 1921). . . There was no provision in the contract that the traction company would arbitrate any dispute over wages arising in January, 1921. . . . The election on the part of the employees to abandon their employment in disregard of the contract made in their behalf by the petitioners could not impose an obligation which was not provided in the contract.

Meanwhile the struggle settled down to a real test of strength between the company and its former employees. All the various angles of the ordinary strike entered the controversy, only they became more pronounced as time went on. Even political factions split over the labor issue. Jitneys and omnibuses then poured into Albany, Rensselaer, Troy Cohoes and Watervliet, the five principal cities in which the company operates, and did a rushing business.

For a long time they provided nearly all of the transportation facilities of the entire section and were the cause not only of a long legal fight but of the break in the Republican organization. William Barnes, the Albany County Republican leader, at a Republican dinner in February, urged the public to support the company. He said that it could not continue to pay the increased wages of the men because of its financial condition and that it was to the best interest of the employees to accept the reduction and the public to prevent the company from going into bankruptcy.

Pressure was brought to bear on Mayor James R. Watt to get him to order the jitneys out of business. He refused. The company then secured a mandamus order from Supreme Court Justice Harold J. Hinman directing him to stop the jitneys from running on the ground that they violated the law prohibiting buses from operating on the same streets with trolley lines. That order was upheld by the Appellate Division, and the police began arresting all jitney drivers and bus owners who were not licensed to run. Out of these arrests grew the recent disorders that at one time apparently threatened to get beyond the bounds of the local police and the State Constabulary to deal with them. Until the issuance of the order forbidding jitneys to carry the people who did not want to ride on the trolleys the strikers and their sympathizers seemingly were content to allow the contest to drag along in the hope that the company might submit or compromise.

The position of the company is that had the questions at issue been dispassionately stated by such a tribunal as the Industrial Commission, had there been a vote thereon with the security and secrecy of the Australian ballot, with an honest count under disinterested authorities, three-quarters, or even one-half, of its former employees would have been found willing to "perform their labor" until the end of June, 1921.

In order that the attitude of the company on the matter might be definitely known, a letter was mailed to each former employee on March 24, last, advising that the company would receive individual applications and that such men as were considered competent and desirable would be employed, with the understanding that the seniority-rights of such employees would begin on the day their applications were accepted; that applications from former employees for their old jobs would be received on and after that date until further notice.

This offer has never been rescinded and is still open to former employees to the extent only however as to such positions as are now vacant as in no event will the men now permanently employed be removed without just cause.

Florida Road Praised

"A Country Banker," writing in the *Saturday Evening Post* for May 21 about his experiences in Florida and elsewhere, said:

> The first time I came here, four years ago, the street-car service was in a poor way—cars old and dirty and with a general air of dilapidation. It was owned by a corporation, and that corporation was owned by another corporation. The car line went into bankruptcy and things got worse instead of better, until finally the city took over the plant. It evidently picked out a capable man for manager, and bought new cars throughout, clean and smart-looking and of a type better adapted to traffic conditions here than the old cars had ever been. It rearranged schedules and put the plant in good shape. And now, although it charges only a 5-cent fare, it is making a quite satisfactory showing, and they are laying out some extensions.
>
> Of course I don't know how much of a return on the capital investment a rigid system of bookkeeping would show. But as the city has to provide transportation for a population of 60,000 in winter and only 20,000 in summer the public officials probably figure that a good street-car service which will pay its way is a good investment for the town. The city also operates a gas plant to the general satisfaction of everybody concerned.
>
> The point is that here is an example of successful politics. The city not only performs the usual functions of a city satisfactorily, but also runs a gas plant and a street-car system very satisfactorily.

The city to which he refers is presumably St. Petersburg.

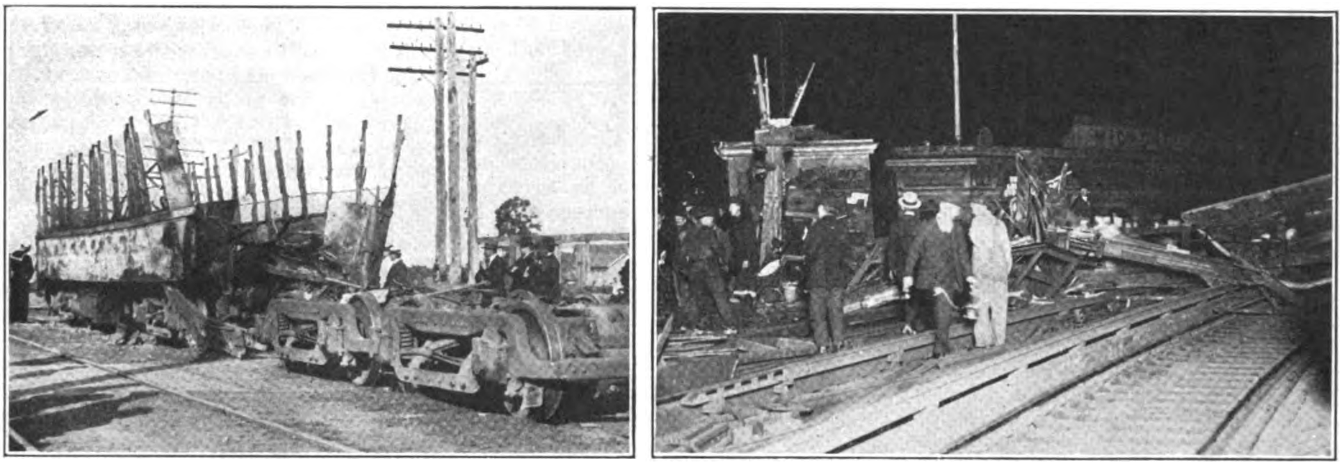
Basis Found for New Orleans Negotiations

C. C. Chappelle, representing the Eastern security holders of the New Orleans Railway & Light Company, New Orleans, La., attended the meeting of the Commission Council on May 25 and submitted his promised scheme of reorganization. Several features of the plan won commendation. It is too much of course to expect that any plan would be acceptable in toto on presentation.

The plan advanced by Mr. Chappelle accepts the rate base valuation of the citizens' advisory committee and assumes $44,700,000 as a fair valuation of the property for rate-making purposes. As opposed to this there are outstanding capital liabilities of $71,000,000. The plan provides for an 8 per cent return. Mr. Chappelle argued that this rate of return was essential to secure new capital. Moreover the holders of the senior securities would have to be compensated to relinquish their position of priority. All of the common stock and virtually all of the preferred stock would be wiped out if the plan submitted were followed. It would probably take $11,500,000 new money to put the company in shape including the sum needed immediately for rehabilitation.

There would be a new company, under a new name, financed largely in New Orleans with a New Orleans man as executive head, and operations to be regulated by the city, with possible representation of the city upon the board of directors.

A scale of rates, to be reduced as the cost of labor, fuel and materials comes down, was promised by Mr. Chappelle.



LEFT—REMAINS OF CAR IN NEW JERSEY WRECK. RIGHT—DEBRIS SHOWING NEW YORK MISHAP

Wage Contract at London Readjusted

The difficulties between the London (Ont.) Street Railway and its employees have been settled by compromise, and a new agreement has been signed. The men asked for an increase in wages from 48 to 52 cents an hour and a yearly agreement. The company refused the wage increase and proposed an agreement which could be ended by either party on thirty days' notice. The employees finally agreed to remain at work for 48 cents an hour, the old scale, with a yearly agreement the wage clause of which can be terminated on sixty days' notice.

The Ontario Railway & Municipal Board operated the railway for a year, but gave up control on April 30 last, after proving that at the present rate of fares—nine limited and seven unlimited tickets for a quarter—the company cannot meet its obligations, one of which is to pave its share of streets traversed by its lines.

Excursionists Meet with Accidents

About fifty people were injured, a few fatally perhaps, on May 30 when a Pennsylvania freight train crashed into a fast car of the Indianapolis, Columbus & Southern Traction Company, known as the Dixie Flyer, at Edinburg, Ind., where the tracks intersect.

Two Public Service Railway cars collided near Roebling, N. J., on May 30, killing one man and injuring about 100 persons. The wreckage took fire. Misunderstanding of orders is believed to have been the cause.

Between fifteen and twenty persons were injured on May 30 in New York City when a Third Avenue Elevated Railroad train bound north with passengers from Staten Island and Brooklyn jumped the track at Westchester and Third Avenues near 149th Street. The first car became uncoupled from the second and went up Westchester Avenue, turning half-way around at Bergen Avenue and blocking north and south-bound tracks. The other cars of the train continued up Third Avenue and smashed a signal tower. When these cars finally came to a stop the second car was left overhanging the elevated structure.

A representative of the Interborough Rapid Transit Company said that the derailing was due to man failure on the part of the motorman. At the point where the wreck occurred there is a spur which connects the elevated road with the subway.

Service-at-Cost Agitation Renewed

Operation at service-at-cost for the Dallas (Tex.) Railway has again come to the fore as the new administration of Dallas, which took office on May 2, is considering reopening the question. This issue was one of the chief points on which the recent city campaign was waged.

M. N. Baker, the first supervisor of public utilities under the traction franchise granted to the Strickland-Hobson interests in 1917, has contributed an important chapter in this discussion in a letter written to Lynn B. Milam, who served as supervisor of public utilities under the administration of Mayor Frank Wozencraft. Mr. Baker strongly commends the stand taken by Mr. Milam in favor of the service-at-cost plan, and declares that in such a franchise alone can the city of Dallas expect to find solution for the many problems confronted in the management and supervision of the city's utilities. Mr. Baker also makes reply to the objections to the service-at-cost plan voiced by Mayor Sawnie Aldredge.

Mr. Baker's letter to Mr. Milam follows in part:

> Mr. Aldredge's fears that the supervisory forces of the city will not be able to determine the proper costs are entirely without foundation, as I know, from experience, that the determination of all facts controlling the operation of the railway is a matter which any business man with proper accounting and engineering advice can easily ascertain. There is nothing illusory about the accounting methods of utilities, and with the supervisory powers of the city properly administered the exact status of all revenues and expenses can easily be arrived at.
>
> But, aside from all this, the immediate necessities of the city with reference to improved facilities and extensions of service require that a definite program be developed by any set of city officials who may hold office. It is evident at the present time that transportation development is at a standstill in our city, and that the present franchise, with its limitation of a 5-cent fare, regardless of the cost of operation, has utterly failed and gives no promise for the future.

Of particular interest in this connection are the plans which have been submitted to the city officials of Dallas by the Dallas Railway for the ultimate development of a system of lines touching every part of the city and affording transportation to the maximum number of citizens. These plans were submitted in connection with the company's application for charter changes, which include the service-at-cost plan of operation with a guaranteed return of 7 per cent on the agreed valuation of property involved in the operation of cars.

In the ultimate development plan numerous changes are contemplated in the existing lines by taking up portions of certain lines and the laying of new lines on other streets. It is proposed to spend $2,000,000 for improvements within the next five years. A complete map of the city showing all changes proposed has been prepared under Mr. Meriwether's direction and has been presented to Mr. Everman for use of the city in studying the proposed changes.

Power Plant Men Strike in Cincinnati

Plants furnishing power for the Cincinnati (Ohio) Street Railway inclines shut down at 11 p.m. on May 31 when twenty-nine stationary engineers employed by the Ohio Traction Company quit their jobs and walked out. Other power plants supplying current for street railway operation were kept going by men who took the strikers' places. Service will probably be curtailed until the strike is settled, but the public may be sure of day transportation at least.

As for owl service, officials of the company would make no definite promises, saying merely that they "expected to keep the cars going and would do the best we can."

The walk-out followed notice served on officials of the traction company at 10:30 a.m. on Tuesday by Charles B. Manwood, business manager of Stationary Engineers Union, Local No. 18, that all engineers employed by the traction company would go on strike at 11 p.m. Tuesday night unless their wage demands for the coming year were met before that time.

A verbal agreement has existed between the company and the union whereby the men have been receiving 90 cents an hour for the last year. The walkout followed refusal of the traction company to renew the agreement and a suggestion on the part of the company of a cut in wages for the engineers.

W. Kesley Schoepf, president of the railway, and Walter Draper, first vice-president, said that officials of the company met with union representatives on Monday morning in an effort to reach some agreement. They said that the engineers refused to accept the offered wages of 65 and 70 cents an hour, declined an invitation to make a counter proposal entailing any reduction in the wage now paid and turned down all offers on the part of the railway to submit the dispute to arbitration.

Mr. Draper said that the main power houses of the company would be operated regularly and that operation of the inclines would be resumed as soon as the company is sure that it has enough men for the purpose.

Strike Averted in Michigan

Throughout the final days of May continuous efforts were made to reach an adjustment of the wage differences between the employees of the Michigan United Railway and the company, and half an hour before the time set for a strike the controversy was amicably settled with the wage cut as the only new feature of the agreement. During the negotiations it was stated that the wage reduction was to come at the conclusion of the wage agreement which guaranteed a wage scale to last until June 1.

Mayor Frank T. Bennett of Jackson led in the attempts which were made to settle the differences amicably. He at one time obtained a promise from the employees to delay action until members of the Chamber of Commerce had had an opportunity to discuss the question with them.

News Notes

Minnesota Roads All Under State.—All electric railways in Minnesota are now under state control as to rates. Franchises have been surrendered by the Minneapolis & St. Paul Suburban Railway granted by the cities and villages it serves. This is the last company to take advantage of the new law passed by the recent Legislature.

Wage Cut Rejected.—Conductors and motormen at Evansville, Ind., have voted to reject the orders of the company for a wage reduction of 9 cents an hour proposed a few days ago by the head of the Southern Indiana Gas & Electric Light Company. The men are still at work. The scale paid to the men is from 45 to 50 cents an hour on the city lines, and 52 cents an hour for men on the interurban cars, and 54 cents an hour for men working the one-man cars.

Service-at-Cost Suggested at Vancouver.—An agreement is now under consideration by the City Council of Vancouver, B. C., by which the British Columbia Electric Railway would give service at cost, selling four tickets for 25 cents, charges for electric light and gas to remain as at present, and be allowed 6 per cent interest on investments made in the past, and 8 per cent on future investments. At present tickets sell for six for 35 cents; the change would mean an increase of 5 cents for every twelve tickets. Blundell Brown, one of the directors of the company, is at Vancouver from London, England, and is understood to be bending his efforts to inducing the city of Vancouver to take over the system when the franchise expires.

Wages Reduced in Johnstown.—General Manager Shannon of the Johnstown (Pa.) Traction Company has announced a reduction of 5 cents an hour in the wages of the employees. The reduction, effective May 22, affects 450 men.

Buffalo May Have Buses.—The International Railway, Buffalo, N. Y., is considering the advisability of running a bus line in Bailey Avenue until such time as it would be justified financially in laying tracks. The company was granted a franchise to lay tracks and operate cars through the street some years ago, but the time limit has expired.

Wage Reduction Suggested.—Trainmen of the Connecticut Company, New Haven, Conn., all over the State held special meetings during the week ended June 4 for the purpose of hearing the report of their wage committee, which has recently been in conference with officers of the railway. While no official statement is forthcoming, it is understood that the committee will report to its constituents that the company refuses to entertain the proposal to increase wages 25 per cent and in reply counters with a proposal to cut wages 15 per cent. The members of the union will be asked to express their views and issue instructions to the committee with respect to the policy to pursue in the future.

Programs of Meetings

American Railway Association

A business session on June 15 and 16, at the Hotel Drake, Chicago, has been proposed by the general committee of the mechanical division of the American Railway Association instead of the convention that has usually been held at Atlantic City, N. J. The reports of standing and special committees have been considerably modified on account of the limited time allowed for the proposed June session. Reports will be received on the following subjects: "Prices for Labor and Materials," "Car Construction," "Loading Rules," "Brake Shoe and Brake Beam Equipment," "Train Brake and Signal Equipment," "Specifications and Tests for Materials," "Tank Cars," and "Standard Methods of Packing Journal Boxes."

Signal Section—A. R. A.

The annual meeting of the Signal Section, American Railway Association, is to be held at Chicago on June 6, 7 and 8. Committee X presents a report on the requisites of signal locations for automatic block signals. This committee, among other things, will report on automatic train control, and on a proposed short code of requisites for light signals. Committee IV will present a code of instructions for making torque tests of power-operated signals, and a drawing of torque testing apparatus. Committee XV on valuation, J. M. Carley, chairman, will present a report of a dozen pages giving the result of studies in valuation details made by several sub-committees.

Financial and Corporate

Twelve Large Companies Compared

Gross Earnings Increase 17 per Cent, but Expenses 22 per Cent and Operating Ratio 4 per Cent

In the April 16 issue of ELECTRIC RAILWAY JOURNAL, figures from the bureau of information of the American Electric Railway Association were given to show comparative results in 1920 and 1919 from a total of 127 electric railways. Of this total seventy-two were city companies and their gross income exceeded $233,000,000 in the past calendar year.

An additional interesting comparison may be made with the data from twelve of the largest city properties, the identity of which cannot be made known. These same properties were considered in a review published on page 38 of the issue of July 3, 1920. Their size may be judged from the fact that their gross earnings in the last fiscal year exceeded $300,000,000 and that they operated one-seventh of the track mileage of the United States. Six of the companies under consideration operate urban surface lines, and the others are rapid transit lines in whole or in part.

The smallest of these properties did an annual business exceeding $8,000,000 and the average receipts of the twelve were more than $25,000,000. The prevailing rates of fare varied, three charging 5 cents; two, 5 cents with a 2 cent transfer charge; one, 6 cents with a 1 cent transfer charge; three, 7 cents; one, 8 cents and two, 10 cents.

STATISTICS PER CAR-MILE AND PER CAR-HOUR ON TWELVE LARGE ROADS

	Six Surface Lines	Six Rapid Transit
Transportation revenue per car-mile (average)	44.7c.	38.0c.
Expenses and taxes per car-mile (average)	37.6c.	30.6c.
Transportation revenue per car-hour (average)	$4.00	$4.63
Expenses and taxes per car-hour (average)	$3.37	3.70

Gross earnings of the six large surface companies showed an increase of 17.4 per cent over the previous year, while there was a gain of 21.8 per cent in operating expenses including taxes. For the six rapid transit companies these increases were 17.2 and 22.3 per cent, respectively. The operating ratio for the surface group averaged 87.45 per cent and ranged from 78.26 to 103.38 per cent, whereas the average in the preceding year was 83.06. For the rapid transit group the average was 77.26 against 74 per cent in the previous twelve months, the percentages for the past year ranging from 57.83 to 89.02. The six companies in the latter group would have made a better showing except for the fact that half of them include a large percentage of surface mileage. Taking those which operate subways or elevated lines only, the operating ratio averaged 73.8. In 1918 their combined ratio was 60.74.

More service was rendered by each car in the past year on surface lines, the annual miles operated per car averaging 36,565 as against 35,703. The contrary was the case for the rapid transit lines, these figures being 38,440 and 39,200, respectively. The showing as to revenue pasengers hauled and revenue car miles operated is not given on a fair basis for the past twelve months because one of the larger properties was split up into several parts which decreased the total for the group of surface lines. As a result the totals for both these items was practically the same as in the preceding year. On the rapid transit lines, however, there was a gain of 11 per cent in number of revenue passengers, while the total of car miles was practically at a standstill. The number of car miles per car hour showed a decrease, evidently due to the fact that the car hours were augmented by contract requirements calling for payment of many "bonus" hours. This item, therefore, is not a true indication of speed performance.

It is impossible to secure a true statements of the total passengers per mile of single track operated because some of the companies, particularly in the rapid transit group, keep no account of transfer or free passengers. However, using the figures as they are presented, there was an increase of 9.4 per cent for surface companies and 4 per cent for rapid transit lines. The number in the former group ranged from 869,223 to 2,381,909, and in the latter from 1,198,190 to 1,603,281, showing plainly the absence of transfer and free passengers from the total.

In these figures, as in the ones given below, the comparison is not entirely fair because five of the companies have a fiscal year ending on June 30, while the others more nearly correspond to the calendar year. The latter class have the advantage of larger earnings from recent increases in rate of fare but on the other hand they were burdened with higher costs due to higher wages starting about the middle of the year.

Puget Sound International Railway & Power Company, Everett Wash.—The Puget Sound International Railway & Power Company will shortly put in operation its Marthas Lake substation.

Baltimore Triples Net

No Dividends Paid on Common Stock —Surplus Being Put Into the Property

The report of the United Railways & Electric Company, Baltimore, for the year ended Dec. 31, 1920, showed net earnings for the year amounting to $2.55 per share as compared with 60 cents the previous year. The par value of the stock is $50. The surplus at the end of the year after making reserve for injuries and damages as well as provision for Federal taxes for the year 1920 amounted to $1,165,027, or 238 per cent more than the previous year. The accompanying tables give in detail the income and expenses as well as miscellaneous statistical information concerning the year's operation in comparison with the previous year.

SURPLUS GOING INTO PROPERTY

The report calls attention to certain matters as the result of the year's operation.

(1) The company had net earnings during the year of $1,043,599 after the payment of all operating expenses, taxes, fixed charges and interest including interest on income bonds. The Public Service Commission of Maryland has ruled that it is to the best interest of the public, under existing conditions, that the company should earn a surplus of not less than $1,000,000 nor more than $1,500,000 for a year.

(2) The company paid no dividends on its common stock, but put the entire surplus, and in fact the entire amount of the year's depreciation reserve, back into the property. These sums, together with the ordinary maintenance account, aggregated a total sum of approximately $4,000,000. These expenditures, together with the acquisition of new cars, have created a marked improvement in the physical condition of the property. During the year a new contract was made with the Pennsylvania Water & Power Company for a full supply of power at a cost less than the company could produce power for itself. This enabled the Pratt Street power station to be sold for $4,000,000, which sum can be used for other capital purposes.

Another interesting item is that the ratio of fixed charges to gross receipts is now 18 per cent as compared with 46 per cent in 1900, which showed that owing to increased receipts the interest charges in 1920 were approximately 18 per cent of gross revenue, as compared with 34 per cent in 1911, and 46 per cent in 1900. During the past two years 41 miles of track have been reconstructed, which is nearly one-sixth of the total amount of trackage within the old city limits. During 1920 there were either built or rebuilt 19 miles of track, of which more than 3 miles represented extensions. During the year the company also abandoned 8.6 miles of old track, which it inherited from the days of duplicated street car service.

There have been added during the year thirty-three one-man front-entrance cars, which have been assigned to the Fremont Avenue line. One hundred double-truck center-entrance trailer cars were also purchased. Car trust certificates as of July 1, 1920 on an 8 per cent basis have been issued for payment of these cars.

All of the one-man front-entrance cars have been in service since July 1 and have demonstrated satisfactory and economical operation, as

INCOME STATEMENT—UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

Year Ended Dec. 31:	1920	1919	Per Cent Change
Revenue from transportation	$17,196,471	$14,711,455	16.89
Revenue from other railway operations	117,128	82,729	41.49
Total railway operating revenue	$17,313,599	$14,794,234	17.03
Railway operating expenses:			
Way and structures	$1,004,747	$915,289	9.77
Equipment	1,087,002	919,863	18.17
Power	75,738	64,080	18.19
Total maintenance	$2,167,487	$1,899,232	14.12
Depreciation	865,680	739,712	17.03
Power service	1,170,404	1,027,846	13.87
Conducting transportation	5,465,492	4,898,515	11.57
Traffic	12,066	5,262	129.32
General and miscellaneous	1,649,712	1,361,383	21.18
Total operating expenses	$11,330,841	$9,931,950	14.08
Net operating revenue	5,982,758	4,862,284	23.20
Taxes, licenses, etc., assignable to railway operation	1,839,421	1,409,262	30.52
Operating income	$4,143,337	$3,453,022	19.99
Non-operating income	120,740	40,017	200.97
Gross income	$4,264,077	$3,493,139	22.07
Deductions:			
Interest on funded debt	$2,030,264	$1,998,600	1.58
Rents	421,384	477,793	*11.81*
Interest on unfunded debt	117,490	93,200	26.06
Interest on income bonds (4%)	559,157	559,080	0.01
Amortization of discount on funded debt	53,068	48,785	8.78
Other amortization items	....	30,000	......
Miscellaneous	39,115	39,257	*0.36*
Total deductions from gross income	$3,220,479	$3,246,715	*4.64*
Net income transferred to profit and loss	1,043,599	246,424	324.00
Profit and loss surplus at beginning of year	345,057	362,370	*4.67*
Profit and loss credits	462,962	342,527	35.20
Gross profit and loss surplus	1,851,619	951,322	94.90
Dividends and common stock	....	204,612	......
Dividends on preferred stock	383	920	58.40
Contributions incident to the war	....	23,176	......
Adjustment of reserve for injuries and damages	170,888	225,000	*24.00*
Provision for uncollectable accounts receivable	....	30,586	......
Income and excess profits taxes	48,008	86,221	*43.40*
Welfare department deficits	....	31,004	......
Adjustment items in cancellation of preferred stock	6,870	....	......
Loss on abandoned equipment of leased road	158,327	....	......
Engineering and other deferred expenses	183,230	....	......
Metal tickets and fare boxes	45,959	....	......
Adjustment account of power contract	56,573	....	......
Miscellaneous	16,354	4,746	244.50
Total profit and loss debits	$686,592	$606,265	13.25
Profit and loss surplus at end of year	$1,165,027	$345,057	238.00

Figures in italics show decrease.

well as ability to furnish a much more frequent headway. The results show a net saving through increased receipts due to increased mileage and decreased cost of approximately 30 per cent per year on the investment. The trailer cars are gradually being introduced and are producing economies both in platform labor and power consumption, at the same time reducing the congestion in the business section of the city, as it is obvious that two cars, operated as a unit, are able to pass through the traffic with greater expedition than two cars operated singly. For the purpose of hauling the trailer cars, alterations are being made to 150 double truck-motor cars. These alterations consist of adding vestibules, folding doors and steps, changing platform control, installing door contacts, lights and signals, as well as a new type of coupling device. The work of vestibuling the double-truck semi-convertible cars is proceeding in accordance with the orders of the Public Service Commission at the rate of six cars per month.

Systematic efforts to reduce accidents showed that notwithstanding the increased car mileage there were 12 per cent fewer accidents than in 1919.

The company has made quite a number of experiments in re-routing of cars and with a service of limiting stops. These experiments have been tried only after an exhaustive study of the situation, which indicated possible favorable results. The public has been most patient with these experiments and should greatly benefit by increased carrying facilities and shortening of time spent upon the cars. This, with the co-operation of the Police Department of the City of Baltimore in helping the traffic conditions, has enabled the company to show approximately 11 per cent improvement in the speed of cars.

Appended to the report are graphic charts showing in detail the various operating costs, the receipts and expenditures per car mile and the distribution of gross revenue in fixed charges and various operating expenses on a percentage basis. An organization chart of the various departments is also attached.

STATISTICAL INFORMATION—UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

	1920	1919	Per Cent Change
Car-miles operated	37,162,202	35,522,354	4.62
Revenue passengers	253,934,179	243,890,966	4.12
Transfer passengers	93,883,660	86,756,575	8.22
Total	347,817,839	$330,647,541	5.20
Operating ratio	65.44	67.20	(a) *1.76*
Car-mile statistics:			
Operating revenue (cents)	46.70	41.70	12.00
Operating expenses (cents)	30.55	28.00	9.10
Net income (cents)	2.81	0.69	3.07
Total revenue and transfer passengers	9.37	9.32	0.54
Car-miles per revenue passenger	0.1069	0.1458	(a) *0.0389*
Taxes—Per cent of gross revenue	10.55	9.50	(a) 1.05
Per cent of net operating revenue	30.75	29.00	(a) 1.75
Return earned and common stock ($50 par)	$2.55	$0.60	324.00
Depreciation reserve:			
Per cent of road and equipment value	1.055	0.972	(a) 0.083
Per cent of operating revenue	5.00	5.00	....

(a) Difference.

Earnings of Ohio Electric Railway Improve

The report of B. H. Jones, receiver for the Ohio Electric Railway system, made to the federal court at Toledo, Ohio, during the week ended April 30, for operations from Jan. 26 to Feb. 28, indicates that under the receivership the group of properties in the system made a substantial gain in earnings over the same period a year ago. The receipts from all sources totalled $1,130,351. After disbursements a cash balance of $102,015 was left.

The Indiana, Columbus & Eastern Traction Company, a subsidiary, had a surplus from operations of $1,346 for the month, compared with a deficit of $11,344 for the same period in 1920.

The Columbus, Newark & Zanesville Electric Railway had a surplus from operations of $9,697 for the month compared with a deficit of $6,895 for the same month a year ago.

The Fort Wayne, Van Wert & Lima Traction Company had an operating surplus of $588.

The Ohio Electric Railroad, which owns and operates the lines from Toledo to Lima, had an operating deficit for the month amounting to $9,496 as compared with a deficit of $18,258 for the same period in 1920.

Refinancing Plans Approved

Stockholders of the Northern Ohio Traction & Light Company, Akron, Ohio, have approved the refinancing plans involving the sale of $4,548,000 of preferred stock, bringing the capitalization to $20,000,000 of equal portions common and preferred.

The new stock will be offered to stockholders on either of the following plans: An exchange of two shares of the old 6 per cent preferred for two of the new 7 per cent by buying one share of the new at $95 and accrued interest, or an exchange of the old for the new by payment of $10 for each share so exchanged. In either case stockholders must agree not to sell their stock for less than $95 prior to Jan. 1, 1923. Stock not taken by stockholders will be offered to customers.

The plan for this rearrangement of the capitalization of the company was reviewed at length in the ELECTRIC RAILWAY JOURNAL for April 30, page 829.

Answers to Accounting Questions

Another Series of Questions and Tentative Answers Under the Uniform System of Accounts for Electric Railways

Another series of tentative answers to questions raised in connection with the uniform system of accounts, prescribed by the Interstate Commerce Commission, has just been issued. As these answers have not received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

THE case numbers covered below are from A-548 to A-563, with certain omissions. Other installments will follow. The omitted numbers represent cases which either are not of sufficient importance to justify publication or involve questions upon which a definite conclusion has not been reached.

Q. (*A*-548). In track renewal work where the old rail is replaced with heavier rail and untreated ties are replaced with creosoted ties, what accounting should be followed?

A. The excess cost of the improved rails, rail fastenings and ties over the original cost (estimated if not known) of the rails, rail fastenings and ties removed shall be charged to the appropriate road and equipment accounts. The remainder of the expenditures less the value of salvage recovered shall be charged to the appropriate accounts in operating expenses.

Q. (*A*-550). To what account should be charged the cost of labor cutting grass and weeds on the right-of-way and about trestles and bridges for protection against fire?

A. To account 8, "Track and roadway labor." (See Cases 61 and 319, Accounting Bulletin 14.)

Q. (*A*-551). To what account should be charged the cost of X-ray apparatus and the expenses of a representative sent to inspect the same before purchase?

A. The cost of the X-ray apparatus, including the cost of inspection, is chargeable to account 538, "Miscellaneous equipment."

Q. (*A*-552). To what account should be charged rent paid for foreign equipment used for maintenance of way and structures?

A. To account 98, "Rent of equipment." (See Case 274, Accounting Bulletin 14.)

Q (*A*-554). To what account should be charged the cost of a waste paper baling machine?

A. To account 538, "Miscellaneous equipment."

Q (*A*-555). A carrier issues one-year notes to refund an issue of two-year notes carried in the funded debt account. Should the refunding issue be accounted for as funded debt and the discount treated correspondingly?

A. The face value of the one-year notes shall be credited to account 430, "Loans and notes payable." The discount shall be included in account 420, "Other unadjusted debits," and amortized by monthly charges to account 221, "Interest on unfunded debt."

Q. (*A*-556). A carrier constructs a track to an industry under agreement that the industry shall advance part of the construction cost and be reimbursed therefor on the basis of cars switched for the industry. What is the correct accounting?

A. The entire construction cost shall be charged to the investment accounts. The amount advanced by the industry shall be credited to account 438, "Other deferred liabilities," and refunds shall be debited thereto as made.

Q. (*A*-557). When a lessee carrier bears the sinking fund charges of a lessor carrier and meets these charges from proceeds of a bond issue, in whose books should the sinking fund accounts be set up and what accounting should be observed with respect to: (a) Payments as made? (b) Accretions to the fund for interest thereon, etc.? (c) The acquirement of bonds for cancellation and retirement? (d) Discount or premium at which the bonds are purchased? (e) Expenses of the trustee incident to the reacquirement of the bonds? (f) Amounts paid for interest, accrued prior to date of purchase?

A. The lessee shall treat the payments as advances or rent according to the terms of the lease, sinking fund accounts being set up in the books of the lessor with accounting as follows:

(a) As payments are made by the lessee to the sinking fund trustee, the lessor shall debit account 402, "Sinking funds," and credit the lessee or the rent account, as appropriate. If treated as rent, a concurrent entry shall be made debiting account 309, "Appropriations of surplus to sinking fund and other reserves," and crediting account 449, "Sinking fund reserves."

(b) Accretions to the fund for interest, etc., shall be debited to account 402 and credited to account 209, "Income from sinking fund and other reserves," and concurrently account 309 shall be debited, and account 449 credited if the amount thereof is to be held as a part of the reserve. If this, or any other item previously appropriated from surplus, is later used in the reacquirement of the carrier's own bonds for cancellation, account 449 shall be debited and account 448, "Funded debt retired through surplus," shall be credited with the amount expended in the discharge of the principal (less the discount, if any, suffered at time of sale).

(c) When bonds are reacquired for cancellation and retirement account 427, "Funded debt unmatured," shall be debited and account 402 credited with the par value of the bonds.

(d) Concurrent with the entry provided in paragraph (c), account 402 shall be debited and account 306, "Miscellaneous credits," credited with the amount of the discount at which the bonds were purchased, or if acquired at a premium, account 402 shall be credited and account 317, "Miscellaneous debits," debited with the amount of the premium paid.

(e) Expenses of the trustee incident to the reacquirement of bonds such as those for advertising, notary's fees, etc., shall be debited to account 317, "Miscellaneous debits," and credited to account 402.

(f) Amounts paid for interest which accrued prior to the date of purchase by the trustee shall be debited to the account originally credited and credited to account 402; and if accrued interest has been set up in the accounts for the period subsequent to the date of reacquirement an adjusting entry shall be made canceling the same. (See Case 312, Accounting Bulletin 14.)

Q. (*A*-560). A carrier wrote off to profit and loss in former years the cost of an investigation concerning the advisability of constructing an extension, the project having been abandoned before construction was begun. The same project is now revived and upon basis of the former investigation the extension is made. Is it permissible to restore the former preliminary costs and include them in the cost of the present work?

A. Expenditures for the preliminary investigation shall be included in the cost of the extension and profit and loss credited with the amount previously charged thereto.

Q. (*A*-561). To what accounts should be charged the cost of hand trucks, miscellaneous hand tools and warehouse scales purchased when an electric carrier begins the handling of freight traffic?

A. The cost of such property is chargeable to account 538, "Miscellaneous equipment," except built-in scales, the cost of which is chargeable to account 524, "Stations, miscellaneous buildings and structures."

Q. (*A*-562). A carrier sells power to an industry at cost, plus a fixed percentage for fixed charges and return on investment and desires to exclude from its power accounts the cost of the power thus sold. Is it permissible to credit the several power production accounts with the cost of production and revenue account 118, "Power," with the balance?

A. The power furnished the industry shall be accounted for as a sale and the entire proceeds therefrom credited to revenue account 118, "Power," unless the power business is accounted for as an auxiliary operation, in which case account 202, "Auxiliary operations—Revenues," shall be credited.

Q. (*A*-563). To what account should be charged the cost of dredging to restore depth of water at a dock used for ferry service incident to railway operations?

A. To account 24, "Buildings, fixtures and grounds."

Boston Deficit Being Reduced Gradually

Revenue from direct operation of the Boston (Mass.) Elevated Railway was $23,003 less during the month of April this year than last, but notwithstanding this handicap the company succeeded in offsetting this loss of revenue and secured a net gain for the month of $222,134. It is anticipated by the management that if the co-operative efforts are continued the deficit which was so formidable last Fall will soon be only a memory. The outstanding deficit is as follows:

	Deficit	Surplus
Year ended June 30, 1920		$17,079
Back pay	$435,348	
Six months ended Dec. 31, 1920	387,691	
Jan. 1 to May 1, 1921		536,773
Squantum service and other adjustments		34,287
Total	$823,039	$588,139
Net deficit, May 1, 1921	$234,899	

In making this statement of earnings public the following principles, enumerated by the board of trustees in connection with the readjustment of wages, were reiterated:

1. The fact that although a substantial decrease has already taken place in many items affecting the cost of living, that cost is not yet upon any settled basis so that it is peculiarly a fitting time to put in practice the belief of the trustees that to be consistent they should be as deliberate and conservative in following the cost of living when it is upon a downward trend as in following it when it is an upward movement.

2. The fact that they thoroughly appreciate the co-operation that the men have given to the management during the past year which has made possible what would otherwise be impossible in the saving of expenditures amounting to large economies; in other words, the existence of the spirit which has financial as well as other value in the conduct of this service.

3. The fact that as public officials they are in charge of a public business entirely disconnected from any private or competitive industries and that in this attitude they should be careful not to adopt as a standard for the payment of compensation any other rule than that of a full fair wage for work that is earnestly performed.

Further comment by the company follows:

> Such consideration carries with it responsibilities. We all have reason to be proud of our work during the past year, but the next twelve months should still further advance our record of efficiency and economy in the interest of the car rider. There must be no idle hours; there must be no waste of material; every move should count.
>
> Co-operation means securing all the revenue, avoiding accidents, being considerate of car riders, helping one another, conserving supplies and materials and not wasting time.

Seattle Far from Being Out of the Woods

According to the monthly report of the Seattle Municipal Railway, $37,338, or about half the amount needed each month for bond redemption, was set aside in April. Revenues were $529,109, against $362,738 expenses, leaving a balance of $116,371. The balance of $37,338 is obtained after deducting interest and depreciation. The balance in March was $32,069. The report said in part:

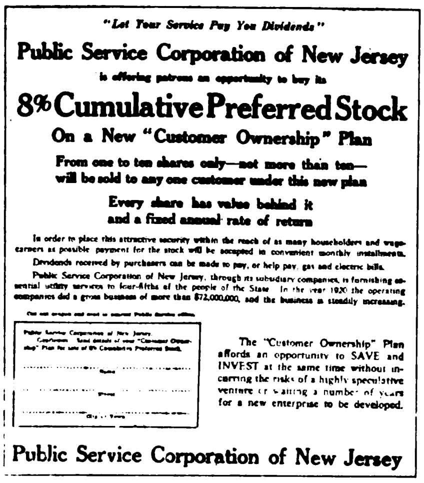
> The report is encouraging, but we are far from being out of the woods. We have not set aside the money for bond redemption, and the interest money has been used to take up outstanding warrant, so that while we have a cash balance of $98,014 at the end of the month there should be considerably more to meet interest and redemption charges.
>
> The depreciation charge has been made only on the books, the money being used to retire warrants. The light department's annual report, just at hand, shows large expenditures on replacements, financed out of the depreciation fund. The depreciation fund in that department is actual not theoretical.

Customers Offered Stock

$2,000,000 of Eight per Cent Preferred Issue Placed on Sale in New Jersey

The Public Service Corporation of New Jersey started a campaign on May 23 to sell $2,000,000 of its 8 per cent cumulative preferred stock to the customers of its three subsidiary companies, Public Service Gas, Public Service Railway, and Public Service Electric Company.

The campaign is under the general direction of R. R. Young, the new business agent. The sales will be made through the employees of the company or directly through the business offices. A partial payment plan will be used, a cash payment of 10 per cent at the time of purchase, and 10 per cent monthly thereafter until the entire purchase price is paid, being the method of sale. The subscription price is par and accrued dividends. Interest at 6 per cent will be allowed upon money paid in until the entire price has been paid.



"Let Your Service Pay You Dividends"

Public Service Corporation of New Jersey

is offering patrons an opportunity to buy its

8% Cumulative Preferred Stock

On a New "Customer Ownership" Plan

From one to ten shares only—not more than ten—
will be sold to any one customer under this new plan

Every share has value behind it
and a fixed annual rate of return

In order to place this attractive security within the reach of as many householders and wage-earners as possible payment for the stock will be accepted in convenient monthly installments.

Dividends received by purchasers can be made to pay, or help pay, gas and electric bills.

Public Service Corporation of New Jersey, through its subsidiary companies, is furnishing essential utility services to four-fifths of the people of the State. In the year 1920 the operating companies did a gross business of more than $72,000,000, and the business is steadily increasing.

The "Customer Ownership" Plan affords an opportunity to SAVE and INVEST at the same time without incurring the risks of a highly speculative venture or waiting a number of years for a new enterprise to be developed.

Public Service Corporation of New Jersey

ADVERTISEMENT OFFERING PUBLIC SERVICE STOCK

The plan marks the start of an entirely new policy on the part of the Corporation. Never before in its history have Public Service securities been offered direct to the public, the method employed heretofore being to sell securities in large lots to investment bankers, who retailed them to the public.

Under the new system of direct sales and partial payment the corporation expects greatly to increase the number of its stockholders among the people who receive its service and thus arouse the interest of its patrons in the company's affairs. Purchasers will become partners in the enterprise with all the rights and privileges, including voting power, that go with the ownership of preferred stock.

The issue has behind it the credit of Public Service Corporation, the subsidiary companies of which in 1920 did a combined gross business of $72,318,087, nearly $35,000,000 more than was done in 1915, and nearly $45,000,000 more than was done in 1910.

Statistics taken from the last annual report of the corporation give some idea of the magnitude of its transactions. The electric company in its eighteen generating stations produced more than 892,000,000 kw.-hr. in 1920, distributed it over 20,000 miles of wire carried on 176,000 poles or lead through 158 miles of conduit to 234,496 meters. In the same year the gas company produced 16,500,000,000 cu.ft. of gas and distributed it through 3,170 miles of main to 553,343 meters, while the railway carried 453,000,000 passengers and operated its cars a total of 60,798,000 miles.

Financial News Notes

No Provision for Interest on Notes.—No arrangements were made for the payment, exchange or extension of the $7,750,000 of 7 per cent notes of the Kansas City (Mo.) Railways due on May 15. No interest accruing on them since that due on May 15, 1919, has been paid, and no interest on any of the company's securities has been paid since July 1, 1919. The company has been in receivership since Sept. 9, 1920.

Railway Appoints Purchase Arbitrator. — Formal notice has been received by the city from the Toronto (Ont.) Railway of the appointment of Sir Thomas White as arbitrator for the company on the board to determine the value of the assets to be acquired by the city when the railway is taken over on Sept. 1 next. Sir Thomas stated that he had not met Sir Adam Beck to discuss the name of the third member of the board, who will be chairman. If the two are unable to agree on one person, an application will be made to the courts to designate a chairman of the board.

New Operating Contract Under Negotion.—Negotiations are under way between the Dallas (Tex.) Railway Company and the Standard Traction Company by which the cars of the Standard Traction Company would be permitted to use the tracks of the Dallas Railway into the business section of the city. The Dallas Railway on May 1 ceased operation of cars on the tracks of the Standard Traction Company, the contract entered into between these two companies having expired. The Dallas Railway at that time said that operation of cars on the tracks of the Standard Traction Company had been continued at a loss and that service could no longer be continued.

Traffic and Transportation

Cincinnati Still Battling

Reduction in Fares May Be Secured by Deferring Collection of Franchise Tax

Following a series of conferences extending over a period of three weeks, participated in by committees representing the city administration, the Cincinnati (Ohio) Street Railway, stockholders, the directors of the company and the Cincinnati (Ohio) Traction Company, assurance has been given that a reduction in fares may be expected Aug. 1, and a still further reduction approximately by Nov. 1. Definite announcement as to this, however, cannot be made until the city indicates its consent to a modification of the franchise ordinance under which the traction company now operates.

The demands of the city are as follows:

1. That improvements of the railway as demanded by the city be made at once.
2. That steps be taken to reduce the prevailing rate of fare as early as possible.
3. That the program concerning the repairing of tracks and streets for 1921 as agreed upon be strictly carried out.
4. That needed repairs on tracks on streets not included in the regular 1921 program be made.
5. That a reduced rate of fare be provided for children of the public and parochial schools.

The Cincinnati Traction Company seems to be in accord with the demands by the committee and a letter was received by members of the committee representing the city administration, signed by W. Kesley Schoepf, president of the Cincinnati Traction Company, in which he said that if financial arrangement could be made he saw no reason why the program could not be carried out.

Mr. Schoepf seeks a postponing or deferring of the collection of the city franchise tax for years 1920 and 1921, saying that the city may reserve the right to make demand for the restoration of all or any portion thereof, as a charge against the company's gross receipts after Jan. 1, 1922. By postponing the payment of this tax, it is believed that it will be legally permissible under the obligations of the service-at-cost franchise to proceed with the reduction of the fare.

The Cincinnati Street Railway has already shown its willingness to assist the Cincinnati Traction Company in getting new capital to make improvements demanded by the city by approving the plan to lend its credit to the extent of $650,000.

Mr. Schoepf's letter follows in part:

I am prepared to say that this company can meet the views of the city administration in these particulars conditioned upon the following:

1. That the Cincinnati Street Railway will assist the Cincinnati Traction in procuring new capital with which to make the desired and needful improvements. This new capital should not only be sufficient to meet immediate requirements but provide for the future and if possible enable the Cincinnati Traction Company to refund outstanding high rate securities at a lower rate, effecting a reduction in fixed charges on the car rider.

2. That the city of Cincinnati will agree to certain amendments to Ordinance No 253, 1918, to provide:

(A) For deferring or postponing collection of the city franchise tax for 1920 and 1921, the city reserving the right to make demand for restoration of all or any portion thereof, as a charge against the company's gross receipts after January 1, 1921.

(B) For removing the requirements of payments into the reserve fund as provided in Subdivision H. of Paragraph 22 or Ordinance No. 253, 1918, as long as fares are higher than seven and one half cents.

(C) That the city will promptly cooperate with the company in developing a plan for rerouting certain lines, thus relieving congestion and saving unnecessary service and thereby reducing costs of operation at the same time as improving the service rendered.

If these conditions can be met—and I can see no obstacle to their being met—I can reasonably assure you that the desired results can be brought about.

INTERCORPORATE SUIT NOT AFFECTING

Mr. Hornberger, chairman of the city committee, stated he realized the force of the argument as to the deferment of the franchise tax, since the traction company is in no financial position to pay it, but that he was prepared to say that the city would consent to the proposal. The same, he said, was true with reference to the reserve fund.

As to that portion of Mr. Schoepf's letter in which co-operation of the city is sought in developing a plan for rerouting it may be said that the city at all times has been willing to cooperate with the officials of the traction company.

Mr. Schoepf announced that whatever results would be achieved as a result of conferences alluded to, the suit for an accounting now pending against the Cincinnati Traction Company is not involved. There can be no compromise of the questions involved in that suit, Mr. Schoepf said. We will insist that the case be tried in open court and that the company be given an opportunity to prove that the charges and claims made against it in the suit are not true.

Six Cents Not Enough.—A 7-cent fare has been asked by the Little Rock Railway & Electric Company, Little Rock, Ark., in a petition filed with the city clerk to be presented to the Council shortly. The company says a raise from the present 6-cent fare is necessary since the income is just sufficient to meet operating costs. This fare was granted one year ago. The petitioners allege that the company has not paid a dividend since 1918.

More Fares Cut

Advantage of Wage Reduction Passed on to Car Rider by Eastern Massachusetts Company

In accordance with promises made to the public prior to the wage reductions just established, the trustees of the Eastern Massachusetts Street Railway announced reductions in fares on all lines, effective on May 23. In general, these changes in fares took the form of increases in the number of rides sold for one dollar the basic single cash fare of 10 cents still remaining the established unit.

The new rates of fare have been computed as nearly as possible, on the basis of giving the car-riders the entire benefit of the reduced operating expenses which will result from the 12½ per cent cut in pay for trainmen and departmental employees. The decision of the Massachusetts Board of Conciliation and Arbitration, handed down on May 14, made this cut effective retroactively to May 2. When the trustees first proposed to reduce the wage scale they made public announcement of their intention to devote the expected savings to immediate reductions in carfares.

No official statement of the probable total reductions in payroll as compared with last year has been made, but it is variously estimated at from $500,000 to $750,000. During the past year a great many one-man cars have been put into service, and it is proposed to continue increasing this type of service until practically the entire system is operating on a one-man car basis.

The principal changes in fares are shown in the accompanying statement. In a number of cases where several rides are sold for a dollar a rebate of several cents is made in order to induce the passenger to turn in the ticket when it is used up. This is for auditing purposes, as the tickets take the form of a card, on which the conductor punches out one number for each ride.

In the following tabulation the average cost per ride allowing for rebate is shown in parentheses after each ticket group:

LINES NORTH OF BOSTON

Lowell-Lawrence district:
  Formerly 13 for $1, with 8c. rebate (7.08c.)
  Now 15 for $1, with 5c. rebate (6.33c.)
Haverhill district:
  Formerly no tickets (10c. cash only)
  Now 13 tickets for $1, no rebate (7.69c.)
Lynn:
  Formerly 15 for $1, no rebate (6.67c.)
  Now 17 for $1, no rebate (5.88c.)
Salem:
  Formerly 14 for $1, no rebate (7.14c.)
  Now 15 for $1, no rebate (6.67c.)
Melrose-Woburn district:
  Formerly 13 for $1, with 8c. rebate (7.08c.)
  Now 14 for $1, with 7c. rebate (6.64c.)
Boston to Revere, ticket rate unchanged:
  Formerly 15c. cash fare
  Now 10c. cash fare
Boston to Lynn, ticket rate unchanged:
  Formerly 30c. cash fare
  Now 20c. cash fare

LINES SOUTH OF BOSTON

Quincy:
  Formerly 13 for $1, no rebate, (7.69c.)
  Now 15 for $1, no rebate, (6.67c.)
Brockton:
  Formerly 13 for $1, with 8c. rebate (7.08c.)
  Now 14 for $1, with 5c. rebate (6.79c.)

Six Cents Cash in Los Angeles

Continuation of the 5-cent fare by the purchase of ten tokens for 50 cents and the establishment of a 6-cent cash fare for individual rides mark the decision rendered by the California Railroad Commission on June 1 in the case of the Los Angeles Railway. The railway applied for an increase in fare last August and a hearing was conducted in October.

Various improvements in service are ordered by the decision. They include the purchase of 132 additional cars to cost $1,400,000, the construction of additional carhouses, shops and substations and the making of track improvements, according to press reports.

A copy of the decision had not been received by the Los Angeles Railway up to the time the telegram containing this information had been filed for transmission to the ELECTRIC RAILWAY JOURNAL and an official statement was withheld by the management.

The commission estimates that two-thirds of the riders will use tokens and with the other third paying 6 cents and the natural growth in traffic, the company should receive under this arrangement a gross annual revenue of approximately $10,120,000.

The commission stated in its opinion that the zone system would be impracticable for Los Angeles except as a last resort.

Petition to Prevent Railway Engaging in Bus Business

A fight has been started before the California State Railroad Commission to prevent the Pacific Electric Railway, Los Angeles, Cal., from entering into the automobile stage business in competition with motor passenger cars that use the highways. The Motor Transit Company, which controls and operates a large number of auto stage lines in and out of Los Angeles to surrounding towns served by the electric interurban lines of the Pacific Electric, is the principal opponent in the fight, contending that a motor bus service recently established by the Pacific Electric Railway between San Bernardino and points in the San Bernardino mountains is an illegal enterprise, and has asked the State Railroad Commission to eliminate the electric line as a competitor. According to the Motor Transit Company's petition it also operates a transportation system in the territory covered by the Pacific Electric in the district referred to.

It is stated that the proceedings instituted by the Transit Company are regarded as a test case. The decision of the State Railroad Commission, it is generally agreed, will establish the status of railroads employing motor lines to compete with those already existing.

The establishment of auto stage lines by the Pacific Electric is said to be in line with a policy announced several months ago by the officials of that company, who stated the corporation would be compelled to enter the automobile transportation business if further inroads into the company's receipts were to be prevented.

Ten-Cent Fare Suburban Lines Last Hope

At the resumption of the hearing on April 26 before the Board of Public Utility Commissioners of New Jersey on the application of the New Jersey & Pennsylvania Traction Corporation, operating between Trenton and Princeton, for an increase in fare from 7 cents to 10 cents in each of four zones between Trenton and Princeton, John J. Treacy, chairman of the commission, remarked that the concern was "harping" upon the fact that a certain amount of money was put in the company and apparently for that reason an increase of fare was expected. In addressing Sidney L. Wright, president of the concern, Commissioner Treacy said:

"Of course you understand, Mr. Wright, that this board can't give you an increase in rates merely because the property owners have put a certain amount of money in the company."

Commissioner Treacy remarked that many other things besides a loss in money to stockholders would have to govern the granting of an increase in rates to a utility company. The commissioner pointed out that operating costs had to be taken into consideration together with wages, cost of power and anything that would tend to make operating costs higher.

Mr. Wright stated that an increase to 10 cents was all that could be expected by the railway, and failing to operate on the increase the company would have to pocket the loss. President Wright admitted to Henry Hartmann, attorney of Trenton, that the 10-cent fare was merely asked for because every other means had been exhausted in an effort to make the company a financial success. Mr. Wright characterized the 10-cent fare application as the concern's "last hope."

One-Man Cars Prohibited

At a recent election the voters of Sacramento decided in favor of an ordinance prohibiting the operation of one-man cars in that city. The Pacific Gas & Electric Company, San Francisco, controls and operates the city lines, but the operating company does not intend to remove the cars from its lines in Sacramento, as they are permitted under the terms of the ordinance to have two men in charge of a one-man car. Therefore, by putting conductors on the cars the company will be within the law. It is apparent that this ordinance was fostered by union forces. It is not stated whether the company will test the constitutionality of the newly passed law.

The New York Transit Commission of New York has made its first report to the Governor. No statement has been made about the contents of the report.

Reduced Fare to Solve Jitney Problem

The Indiana Public Service Commission will reduce the fare of the Indianapolis Street Railway to 5 cents and increase the transfer charge to 2 cents for a period of sixty days, according to a decision reached following a conference with members of the City Council. The Council will order the company to reroute cars in the downtown congested district in an effort to obtain faster schedules and improved service. These measures will be taken in an attempt to enable the company to compete successfully with jitney lines, and if a decrease in "jitney" traffic is not shown at the end of the sixty days, the Council will pass an ordinance regulating the operations of "jitney" lines.

These are the outstanding points of agreements reached at the joint conference which was held in the office of John W. McCardle, chairman of the Public Service Commission, attended by all members of the Council, all members of the commission and Samuel Ashby, city corporation counsel. It was arranged as a result of testimony given the commission by officers of the railway in their petition for relief from operations of jitneys. The order for 5-cent fare and 2-cent transfer charge will be made soon unless some unforeseen event arises to cause reconsideration, Mr. McCardle said.

This appears to be the best solution of the problem of "how to compete with the jitney." Since the inception of the 6-cent fare the jitneys have been doing an enormous business while the result of operation on the Indianapolis Street Railway from April 18 to May 17, 1921, shows a decrease of 851,109 revenue passengers.

Seven Cents in Norfolk

The City Council of Norfolk, Va., has passed an ordinance granting the Virginia Railway & Power Company a 7-cent fare with free transfers until Jan. 1, 1922, unless the granting of a new franchise automatically cancels the temporary rate sooner. The increase was based on a report by Charles E. Ashburner, city manager, who upheld the contention of the officials of the company that its operations are resulting in a net loss, which will force the company into the hands of a receiver unless relieved. The ordinance takes effect thirty days from the date of passage, but it will not be placed in operation until a similar increase on the county lines to be asked by the Virginia Corporation Commission becomes effective. An audit of the company's books, according to Mr. Ashburner, showed a net deficit of $218,229 for nine months, after deducting net earnings, the depreciation charges, interest on bonds, and payment on guaranteed stock. He estimated a 7-cent fare will increase revenue for nine months by $251,590, or about $33,000 more than the money needed to pay the interest charges.

Limited Interurban Bus Service

The Smith-Thompson Transportation Company, Everett, Wash., which when incorporated will be known as the "Interurban Motors Company," has placed orders for six White chassis, which have been delivered, and the bodies are now in course of construction. Four of the cars will be of the type used at present between Olympia and Tacoma, but two will be limited cars, having many new features.

Schedules have been completed which will yield a half hour service between Everett and Seattle, hourly service between Everett and Mt. Vernon by bus and two-hourly service between Everett and Bellingham. Under these conditions seven through connecting trips per day will be made between Bellingham and Seattle each way and the time will be four hours and four minutes. The fare will be nearly $1 cheaper than the steam road fare for a round trip.

The new service will link up the Northern and the Southern divisions of the Pacific Northwest Traction Company.

Commission Would Have Railway Operate Buses

President Emmons and General Manager Flowers of the United Railways & Electric Company, Baltimore, Md., conferred recently with members of the Public Service Commission on the bus situation. The commission is desirous of having the railway establish bus service in certain sections of the city which do not produce sufficient traffic to justify the laying of tracks for regular trolley service. It is also desired by the commission that the railways establish bus service on East Fayette Street in order that the number of "fly-by-night" machines on that street may be lessened and the traffic concentrated in a company of financial responsibility.

At the same time there was some discussion of taking the blue line buses off Charles Street, which is becoming greatly congested, and transferring them to St. Paul Street, at least as far as North Avenue. These buses are run by the United Railways.

The railway officials are said not to look with favor on the establishment of bus lines as a supplemental service, but President Emmons expressed a desire to go as far as the company's finances would permit in meeting the wishes of the commission. Nothing definite was determined upon at the conference, but Commissioner Whitman stated that he was at work on a plan for handling the bus situation, which will be shown to the railway's officials later.

The jitney business in Baltimore is practically confined to one small line operating cheap buses on East Fayette Street. It would appear to be the thought of the commission to determine whether there is an actual need for this line, and, if so, whether it would not be profitable to have it operated by the railway, which could be held to more responsible operation than the present private owners.

Transportation News Notes

Fares Remain Ten Cents.—The Mississippi Railroad Commission recently ruled that the Meridian Light & Railway, Meridian, Miss., must retain the 10-cent cash fare in that city. Children's tickets will be 5 cents. The company must issue tickets at the rate of six for 45 cents, each ticket good for one ride and one transfer. The commission's decision will abide for six months.

Council Approves Increase.—The City Council of Flint by a vote of eight to four recently approved a resolution authorizing an increase in fares on the Flint city lines of the Detroit United Railway from 5 to 6 cents. This action was taken on recommendation of a citizens' committee which had made a thorough investigation of the company's request for a higher fare. An examination by Prof. H. E. Riggs of the committee showed that the Flint city lines had been losing money for several years.

Suburban Fare Advanced. — The Dallas (Tex.) Railway has announced an 11-cent fare to Highland Park, which includes the line to Southern Methodist University. The company has been charging only 6 cents to Highland Park, which maintains corporate existence separate from the city of Dallas. A fare of 6 cents will be charged to the city limits of Highland Park, and an additional charge of 5 cents will be collected for those who ride beyond the boundary. It is likely that tickets will be sold to students at the university so that no hardship will be worked on them.

Seven-Cent Fare Sustained. — The Public Service Commission of Pennsylvania has upheld the 7-cent fare on the lines of the Shamokin-Mt. Carmel Transit Company. This finally puts an end to litigation that has extended over a period of four years. The case was started in June, 1917, with the borough of Ashland, the borough of Centralia and the mine locals of Centralia, Mt. Carmel, Kulpmont and Shamokin making the complaints. In its findings, the commission allowed a valuation of $1,300,000 on the property, and said that the profits of $56,848 for the year 1920, were not excessive, yielding only 4⅓ per cent. On June 4, 1917, the company abolished the custom of selling tickets, and substituted in place thereof, a 5-cent cash fare for each zone. On Jan. 15, 1918, the company made a further increase by substituting a 6-cent cash fare in each zone for the 5-cent cash fare. Subsequently the motormen and conductors struck for higher wages and the War Labor Board allowed the men a substantial increase. To meet this increase in wages, the company, raised the fare from 6 cents to 7 cents, which increase went into effect Sept. 26, 1919.

Official Freed of Charge.—New York City Comptroller Charles L. Craig was recently relieved by Judge Manton in the Circuit Court of a contempt charge found by Judge Mayer carrying a sixty-day jail punishment. The charge grew out of a communication between the defendant and Public Service Commissioner Nixon, in which Mr. Craig is said to have asserted that the federal justice prohibited an investigation by the city into the records of the Brooklyn Rapid Transit receiverships. In his findings Judge Manton says: "There is no divinity about the office or duties of a judge which makes him free from criticism. The statute requires a misbehavior which causes an obstruction of the administration of justice."

Company Voluntarily Reduces Fares.—W. J. Harvie, general manager of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., recently announced a fare reduction in Auburn to 7 cents. The company received permission from the Public Service Commission to sell fourteen tickets for $1 on the city lines and eleven lake tickets for the same amount. The straight fare in Auburn is 8 cents and 10 cents to Owasco Lake. In explaining the voluntary reduction Mr. Harvie said: "The public took the fare increases of the past two or three years in a big way. We have cut the cost of operation by the installation of one-man cars and it is no more than right that the people using the trolley share in this saving." The one-man car system in Auburn was put into effect on May 1. The company has reported that this method has been working out very satisfactorily.

Sustains Seven-Cent Fare.—The city of Fort Wayne, Ind., has lost its fight before the Public Service Commission against the Indiana Service Corporation for a reduction in fares, for the commission has announced the indefinite continuance of the 7-cent cash fare, with four tickets for 25 cents. The present rate of fare was established in the fall of 1920. The city sought a cash fare of 6 cents, or nine tickets for 50 cents. The commission in its order said that for the six months ended March 31 the railway made a return of 8 per cent on its investment, which was said to be $2,846,358. "This income shows that during the best six months of the year from the street railway standpoint, the months in which the maintenance work is normally the least and the number of revenue passengers the greatest, that the company earned no more than a reasonable return on its investment," the order said. The final conclusion of the commission is that "the petitioner will not earn in excess of a reasonable return under the fares now in effect."

Personal Mention

Mr. Kubu Returns to Cleveland Claims Department

Joseph S. Kubu, for nine years claim agent of the Utica Lines of the New York State Railways, has been appointed assistant superintendent of the accident department of the Cleveland (Ohio) Railway. In accepting the appointment Mr. Kubu returns to old friends and associates in a familiar field, as he had been successively investigator, adjuster and assistant claim agent of the Cleveland Railway before going to Utica in 1912. Mr. Kubu's long experience in claims work, his wide acquaintance with men in this department of public utility service, and an active participation in the work of the American Electric Railway Claims Association led to his election, in 1919, to the position of secretary, which he still holds.

His work with the New York State Railways had been of the highest order and has merited the attention of many traction companies from which he received offers. He had refused all inducements until his old employers made him the proposition of taking charge of their claim department. Mr. Kubu's home is in Cleveland.

Herbert E. Cady, Syracuse, succeeds Mr. Kubu at Utica. He has been assistant to Ansel D. Brown, claim agent for the New York State Railways at Syracuse, and is very popular among the railway officials of both cities.

Messrs. Carmichael and Bucher Promoted

D. C. Carmichael has been elected assistant secretary and E. R. Bucher has been elected assistant treasurer of the Southern Power Company, Charlotte, N. C. Mr. Carmichael and Mr. Bucher will share between them the duties formerly performed by E. C. Marshall, who was elected president of the Southern Public Utilities Company.

Also at the annual meeting of the Mill Power Supply Company Messrs. Carmichael and Bucher were elected secretary and treasurer respectively. W. G. Thomas, who had been manager of the company for the past four years, was made president and manager, succeeding N. A. Cocke as president.

Mr. Carmichael has been with the Southern Power Company for about ten years, serving a considerable part of that period as secretary to W. S. Lee. Mr. Bucher has been with the company since 1905, having been auditor for the company for a number of years past. Both are recognized by the company as young men of splendid qualifications.

The Mill Power Supply Company is the purchasing organization for the Southern Power Company, the Southern Public Utilities Company, the Piedmont & Northern Railway and other Duke interests in that section.

Steps Up to Managership

H. W. Witherspoon Promoted from Dispatcher to General Superintendent of Stark Electric Railroad

H. W. Witherspoon has been appointed general superintendent of the Stark Electric Railroad, with headquarters at Alliance, Ohio, to succeed M. L. Mowry, who recently resigned.

Mr. Witherspoon is a steam railroad man, having received his early railroad training as a telegraph operator, entering the service of the Pennsylvania Railroad on the Cleveland & Pittsburgh Division in 1901. He resigned two years later to enter the employ of the New York Central as an agent and telegraph operator, being promoted to the dispatcher's office late in the year of 1905. After holding the position of chief train dispatcher in 1917 he resigned a year later to become connected with the Stark Electric Railroad.

H. W. WITHERSPOON

While in the service of the New York Central Mr. Witherspoon had the honor of being the first train dispatcher to make use of the telephone in dispatching trains on a steam railroad. During his service with that road he contributed much toward the successful use of the telephone in railroad service.

Mr. Witherspoon will have entire charge of the operation of the Stark Electric Railroad Company's property. While his rise from the position of dispatcher to general superintendent is unusual it is certainly evidence of his ability and knowledge of the electric railway field.

The Stark Electric Railroad is an interurban which operates high-speed passenger and freight service, connecting Canton, Louisville, Alliance and several other Ohio towns. Besides operating a trackage of about thirty-six miles it owns and controls a pleasure park near Alliance.

Arthur W. Senter, superintendent of Division 4, Boston (Mass.) Elevated, left in April for Christiania, Norway, where he will investigate street railway conditions. From there he will proceed to Stockholm, Sweden, covering as many traction properties as possible, arriving home the early part of June.

Harrison Williams was elected chairman of the board of directors and chairman of the executive committee of the North American Company on May 20. As chairman of the board he is acting president. Mr. Williams became a director of the North American Company in June, 1920, when Clarence Dillon, George P. Miller, Edward N. Wells, and Frank L. Dame were also elected to the board of directors.

Walter A. Shaw, for more than seven years engineering member of the Public Utilities Commission of Illinois, has returned to practice as a consulting engineer, with offices in Chicago, Ill. He will give particular attention to public utility rate cases, reports for banks and investors, public utility and industrial management, operation and construction, and all branches of municipal engineering and construction work, including designing and supervision.

H. E. Blain, C. B. E., assistant manager of the London Electric Railway and the Underground group of companies in London, who arrived this week in New York on the Olympic, will be joined by two other officers of his company shortly. These are C. S. Louch, controller and accountant, and J. L. B. Lindsay, assistant secretary to the treasurer. These gentlemen expected to sail from England on May 31 and will join Mr. Blain in New York for a trip of investigation of electric traction matters in this country.

C. H. Evenson and **C. E. Jones** have been appointed assistants to the general superintendent of transportation of the Chicago Surface Lines. Mr. Evenson is thirty-six years old. He has been connected with transportation companies in Chicago since 1908. For three years he was secretary to the president of the Calumet & South Chicago Railway, and for eight years he was secretary to the president of the Chicago City Railway and the Chicago Surface Lines. In February, 1920, he was transferred to the transportation department. Mr. Jones entered the service of the Chicago City Railway as a gripman in 1882. Three years later he was made a starter and in 1897 he was appointed supervisor. In 1906 he was made an assistant division superintendent and in 1912 was promoted to the position of division superintendent.

New Interests in Detroit United

Frank W. Brooks Has Resigned as President and Alex Dow of the Detroit Edison Has Been Elected a Director

Frank W. Brooks, president of the Detroit United Railway and its subsidiary properties, tendered his resignation as president and member of the board of directors at its meeting on May 25. Alex Dow, president and general manager of the Detroit Edison Company, has been elected to the board of directors. He will represent new Eastern financial interests which have entered the company. Malcolm McIntyre has resigned from the position of night superintendent to accept the appointment as general superintendent of the Mobile (Ala.) Railway.

PRESIDENT BROOKS resigned because of failing health. It was with unanimous expression of regret the resignation was accepted by the directors. Mr. Brooks' successor has not yet been named. He has made no definite plans other than to rest from business affairs.

Owing to Mr. Brooks' failing health the resignation has been expected for some months past, although it was the hope of his associates that he would be able to continue his responsibilities during the present fiscal year. However a more recent development of his physical ailments has required him to surrender his labors with the company.

F. W. BROOKS

The career of Mr. Brooks is virtually the history of interurban railway development, especially in the vicinity of Detroit. Mr. Brooks was born in Waco, Texas, March 4, 1865. He was educated in private schools in Waco and was graduated from the Texas State College, where he specialized in engineering. In 1882 he became identified with the construction of the New Orleans & Texas Pacific Railway. In succession he followed his chosen engineering work with the Queen & Crescent Railway and the Louisville, New Orleans & Texas Railway, afterward part of the Illinois Central.

From steam roads Mr. Brooks turned to the field of electric railway construction and operation in 1895, when he became general manager of the Rapid Railway, then under construction and one of the first lines in the country to develop the use of the trolley for the delivery of freight and mail as well as to carry passengers between adjoining communities.

When the Rapid Railway, through financial negotiations, passed into the control of the Detroit United Railway in 1903 Mr. Brooks was made assistant general manager. Within a short time he relieved Jere C. Hutchins, at that time president, of the detailed work of general manager. In February, 1916, Mr. Brooks was elected one of the vice-presidents of the company. In June, 1916, he was made president following the retirement of Mr. Hutchins to become chairman of the board of directors.

MR. DOW FAVORABLY KNOWN LOCALLY

Alex Dow, who has accepted the appointment to the board of directors of the Detroit United Railway, is president and general manager of the Detroit Edison Company and a member of the Detroit Water Board. He has always shown a marked leadership in establishing ideals of public policy, although more directly in connection with the power and lighting utilities than with railways. His ability has been so directed as to instill into the employees of his own company those ideals in such a way as to give a practical demonstration of their working.

It has been principally through Mr. Dow's sound business judgment and through his economic understanding that the Detroit Edison is a company which now represents the consolidation of several others. His policy has been to maintain the property and at the same time pay enough return on the investment so that capital would be attracted. His system of training his men to meet the public in an open-minded way and to believe the customer is right has proved most successful.

Mr. Dow's familiarity with conditions in Detroit mark him as one well able to participate in formulating the future policies of the Detroit United Railway.

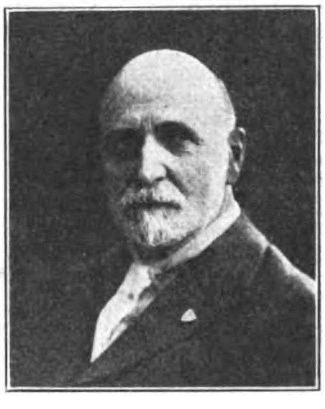
After the announcement that he had been appointed to the board Mr. Dow issued the following statement:

> I have been asked by Harrison Williams, New York, to serve with him as a director of the Detroit United Railway. He and some friends of his have recently become interested in the Detroit United Railway. Mr. Williams suggested that I could be of help in dealing with the complications of our local street railway service, which he wants to see straightened out as quickly as possible.
>
> J. C. Hutchins, chairman of the board of the Detroit United Railway, tells me that he and the other senior directors will be glad to have me on the board. I have agreed to serve for the present and to continue so long as I am needed, or so long as I find I am working to the common good.
>
> I do not know what will be undertaken first or what part I will be asked to do personally. It looks like real work that I did not seek, but cannot honestly shirk.

Following the announcement of Mr. Brooks' resignation came the news that Malcolm McIntyre had severed his connection with the company to become general superintendent of the Mobile (Ala.) Railway.

Mr. McIntyre became identified with the Detroit United Railway as agent of the Rapid Railway at Algonac in 1903. Later he was appointed foreman at the Canfield carhouse, Mt. Clemens. He was subsequently transferred to Detroit, becoming foreman at the old Clark Avenue carhouse, and then assistant superintendent of the Jefferson line. After serving as superintendent of the Orchard Lake Division he resigned from the Detroit United Railway in 1908 to become general manager of the San Francisco, Napa & Calistoga Railroad.

He returned to Detroit in 1914 and became identified with the Detroit United Railway's consulting engineering department. Later he was made special car agent, then night superintendent of the Detroit city lines. The past few months he has been in the company's schedule department but still retained the title of night superintendent.


ALEX DOW

At a meeting planned to be held in New York on June 1 it was proposed to consider problems confronting the company and to fix the scope of Mr. Dow's activities, but at the last minute the meeting was put over until June 3.

As previously indicated the resignation of Mr. Brooks was not unexpected. It is the most important, however, of a series of changes in the operating personnel extending over a period of some months. One of the first officials to resign was Mr. Rifenberick, consulting engineer. He retired in January to start a private consulting engineering practice. Following him W. E. Cann left the company in February to become street railway commissioner at Toledo, Ohio. Changes then occurred in the status of F. W. Brooks, Jr., and E. H. Ives with the company. Mr. Brooks was promoted to assistant to the president and general manager, the position formerly held by Mr. Cann. Mr. Ives then succeeded Mr. Brooks to the office of assistant general superintendent.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Electric Railway Cars Built in 1919 Number 2,352

Census Bureau's Preliminary Figures Show Decrease Over 1914—Also Fewer Steam Passenger Cars

A preliminary statement of the general results of the 1919 census of manufacturers with reference to the construction of steam and electric railroad cars has been issued by the Bureau of the Census, Department of Commerce. Returns were received in 1919 from 121 establishments which manufactured 162,511 steam and electric railroad cars, valued at $403,517,000, these figures including such cars as were built in railroad repair shops, and as subsidiary products by establishments engaged primarily in other lines of manufacture.

The statistics for 1919 and 1914 are summarized in the following table. These figures are only preliminary and are subject to further change.

CONSTRUCTION OF CARS FOR STEAM AND ELECTRIC RAILROADS

Total cars built:	1919	1914
Number	162,511	137,823
Value	$403,517,000	$164,960,000
Steam railroad cars:		
Number	160,159	134,960
Value	$389,078,000	$154,797,000
Passenger:		
Number	294	3,568
Value	$ 5,602,000	$ 45,245,000
Freight and other:		
Number	159,865	131,392
Value	$383,476,000	$109,552,000
Electric railroad cars:		
Number	2,352	2,863
Value	$ 14,439,000	$ 10,163,000

Air-Break Circuit Breakers on Short Deliveries

Market Is Improving but Not Due to Electric Railway Buying—Prices Lower in Some Quarters

Although the market for air-break circuit breakers can be characterized as only fair, nevertheless reports from manufacturers indicate a real upward trend in business. In general March has been better than February and April better than March, while May has started out at a still better rate than April. Much of this business, however, has resulted from intensive sales efforts and has not come by any waiting policy. The market presents a spotty tone at times rather than an even flow of business. But the total adds up fairly well, and it is felt that by fall business will have picked up considerably.

A feature of the ordering is the quick shipments that are so often required. Apparently customers have waited till the last moment to order, and generally they have been accommodated. Shipments from factory stock are commonly made, and up to two weeks is about as long as is necessary to fill a bill. Whole panels using air-break equipment seldom take more than three weeks now. Much of this air-break equipment can be stocked and some manufacturers are working toward this end.

Industrial plant buying is very quiet. Utilities are providing considerable activity, and the same can be said for hotels, apartment houses, etc., for use on either street service or isolated plant lines. For the large station boards there is little market at present. Electric railway buying both for stations and for substations is reported extremely dull.

Factory operation is well below capacity, probably 50 per cent, and overhead and labor charges are still heavy under these conditions. Raw-material prices are down considerably, it is true, but with labor entering into the breaker cost so materially certain producers have made no change in prices. On the other hand, there have this year been recessions from the peak of from 10 per cent to 25 per cent by certain manufacturers.

Special Trackwork Orders for Repairs

General Situation Quiet, Though One Large Producer Reports Improvement in Electric Railway Buying—Wage Decision Expected to Stimulate Steam Railroad Activity

Although one large producer of special trackwork in the electric railway field reports that orders show quite an improvement recently, the general situation both in the girder and T-rail trackwork markets appears to be quiet. Isolated and concentrated activity in a few sections of the country rather than a general improvement account for the increase in buying noted above. It is true, however, that street railways have been more active than steam railroads in this market of late. Orders, of course, represent pressing repair needs, for the most part, rather than new track extensions. Steam road business remains flat, though signs of an awakening activity are noted in the slightly increasing inquiries that some producers are receiving. The export market is absolutely dead in both fields.

There was a fair amount of girder and T-rail business placed around the first of the year, but since that time buying has held off despite the large potential demand that is existent. Expectations of lower prices, money tightness and need of lower labor costs are factors which have largely been responsible for this. Producers are divided as to whether an increase in demand may be expected later this year. One view holds that as this business is so largely seasonable, conditions will not improve until the spring of 1922. Others, however, are looking forward hopefully to the last quarter of this year.

This latter view finds some confirmation in the decision of the Railroad Labor Board, just announced, making reductions in the scale of pay of railway workers averaging 12 per cent effective July 1. The wages of section men are reduced approximately 18 per cent, however, and with this impetus to lower track construction costs it is not illogical to expect an increase of steam railroad activity.

Deliveries at the present time are reasonably prompt and do not seem likely to become pushed despite the fact that operation in this field is down to low levels. Special trackwork makers who do not roll their own rails are carrying comparatively low stocks but are able to replenish them as needed for steel mills can furnish rails in six weeks' or less time. Producers are keen for business and with the quality of present competition prices on special trackwork are being shaded. Deliveries of ordinary girder rail work probably average four to six weeks and T-rail orders can be filled with even greater promptness.

Five Million Street Railway Lamps Sold in 1920

Percentage Is Slightly Smaller in 1920 Than in 1919, but Total Sales Are Greater

Sales of street railway lamps in the United States during the year 1920 amounted to 3.2 per cent of the total tungsten filament vacuum type lamps sold. In 1919 the figure was 3.3 per cent and in 1918 it was 3.8 per cent. During 1920, then, of the 161,000,000 vacuum type tungsten filament lamps sold, 5,152,000 must have been street railway lamps. In 1919 about 4,719,000 street railway lamps were sold out of a total of 143,000,000 tungsten filament vacuum type large lamps.

There were 41,000,000 lamps of the gas filled type with tungsten filament sold during the year, bringing the total tungsten filament lamp sales to 202,000,000. In addition 9,000,000 carbon lamps were sold in 1920. Carbon sales now represent only 4½ per cent of total large lamp sales. In 1919 it was about 7 per cent. The preceding figures were taken from the report of the lamp committee before the National Electric Light Association in convention at Chicago this week.

Prompt Shipments Rule for Carbon Brushes

Buying of Brushes by Traction Interests Is Still Light and Stocks Are Not Being Built Up There

Manufacturers of carbon brushes quite uniformly report a quiet market for their product this spring. With industrial operation at its present low point in so many lines of activity throughout the country fewer motors are being run and fewer brushes are being bought. On the other hand, in certain lines, such as the steel industry, opportunity is being taken of slack production to overhaul electrical equipment, and there the demand for replacement brushes holds up fairly well. Electric railways are not endeavoring to carry surplus stocks, and their buying is of the hand-to-mouth order. Central-station companies at the present time are buying most nearly to their normal requirements.

There are signs of better business ahead, however; in fact, in certain quarters it is stated that the carbon-brush business in May represented an improvement over the previous three months. Producers as a rule are proceeding cautiously, nevertheless, on the supposition that the next few months may be lean ones. Production is down to 50 to 75 per cent of capacity, inventories being reduced accordingly.

Stocks of the semi-finished products are in ample shape to take care of customers, however, and shipments at present are very prompt. Prices are still at their peak except with one producer who is selling brushes at their present replacement cost, and this, it is stated, figures about a 10 per cent reduction. Other manufacturers are quoting on a price basis which has remained constant since the end of 1918.

$1,400,000 in Cars for Los Angeles

In a decision rendered June 1 fixing the fares for the Los Angeles (Cal.) Railway, the Railroad Commission of California has ordered various improvements in service. Included among these is the purchase of 132 additional cars to cost $1,400,000.

Large Fare Register Order Placed

The Philadelphia Rapid Transit Company has placed an order with the International Register Company for 2,654 single-dial registers of the R-7 type. The railway already has 2,900 registers of this type in use and the new order will bring the total number on this property up to over 5,500. The new registers will be installed on cars already equipped with cash fare registers, for the purpose of recording tickets as well. A second register was placed on each car rather than discard those already in use and substitute a double-dial register. Of the registers already in use in Philadelphia 350 were purchased in 1901 and 1902 and 2,200 in 1908 and 1909.

Rolling Stock

Pacific Northwest Traction Company, Everett, Wash., will replace all old-type cars on its lines in that city with new Birney safety cars. Several cars have been replaced and others will be added in the near future.

Track and Roadway

Ontario Power Commission, Ontario, Can. — The town of Walkerville will not press the Ontario Power Commission for any new lines on Ottawa Street and Monmouth Road as planned. By waiting a year Councillor Calderwood says the commission can save the municipalities many thousands of dollars in construction costs.

Union Traction Company, Anderson, Ind.—The Union Traction Company of Indiana has begun improvements in its track through Hartford City, Ind. The cost will be $10,000.

Boston & Eastern Electric Railroad, Boston, Mass.—The Committee on Railroads gave a hearing recently on the petition of the Boston & Eastern Electric Railroad for extension of time to April, 1924, to build and operate the railway and tunnels which were provided in the act incorporating the company in 1911. There was no opposition to the hearing.

Nuevo Laredo, Mexico.—Contract for reconstruction of the railway lines in Nuevo Laredo, Mexico, just across the Rio Grande from Laredo, Tex., has been awarded by Luis Barreda, president of the company, to H. R. Mason, of Laredo.

NEW YORK METAL MARKET PRICES

	May 4, 1921	June 1, 1921
Copper ingots, cents per lb	12.62½	13.25
Copper wire base, cents per lb	14.50	15.00–15.25
Lead, cents per lb	4.75	5.00
Nickel, cents per lb	41.00	41.00
Zinc, cents per lb	5.45	5.20
Tin, cents per lb	31.87½	31.50
Aluminum, 98 to 99 per cent, cents per lb	28.00	28.00

OLD METAL PRICES—NEW YORK

	May 4, 1921	June 1, 1921
Heavy copper, cents per lb	10.00 to 10.50	10.75 to 11.00
Light copper, cents per lb	7.50 to 8.00	8.25 to 8.37½
Heavy brass, cents per lb	5.50 to 5.75	5.25 to 5.50
Zinc, old scrap, cents per lb	2.87 to 3.00	2.50 to 2.75
Yellow brass, cents per lb	3.75 to 4.00	4.00 to 4.50
Lead, heavy, cents per lb	3.75 to 3.90	4.25 to 4.50
Steel car axles, Chicago, per net ton	14.00 to 14.50	14.50 to 15.00
Old car wheels, Chicago, per gross ton	13.50 to 14.00	13.50 to 14.00
Steel rails (short) Chicago, per gross ton	13.00 to 13.50	14.00 to 15.00
Steel rails (rerolling), Chicago, gross ton	12.50 to 13.00	13.50 to 14.00
Machine shop turnings, Chicago, net ton	5.00 to 5.50	3.50 to 4.50

ELECTRIC RAILWAY MATERIAL PRICES

	May 4, 1921	June 1, 1921
Rubber-covered wire base, New York, cents per lb	16.00	16.00
Weatherproof wire base New York, cents per lb	15.50	15.50
Standard Bessemer Steel Rails, per gross ton	45.00	45.00
Standard open hearth rails, per gross ton	47.00	47.00
T-rail, high (Shanghai), per gross ton, f.o.b. mill	.....	.....
Rails, girder (grooved), per gross ton, f.o.b. mill	.....	.....
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.40	3.40
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb	6.00	5.50
Fish plates, cents per lb	2.75	2.75
Angle bars, cents per lb	2.75	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	4.50	4.50
Steel bars, Pittsburgh, cents per lb	2.10	2.10
Sheet iron, black (24 gage), Pittsburgh, cents per lb	3.85	3.85
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	4.55	4.55
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	May 4, 1921	June 1, 1921
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount*	82%	82%
Car window glass (single strength), first three brackets, B quality, New York, discount	82%	82%
Car window glass (double strength, all sizes, A quality), New York, discount	83%	83%
Waste, wool, cents per lb	11 to 17	11 to 17
Waste, cotton (100 lb. bale), cents per lb.		
White	9.00 to 13.00	9.00 to 14.00
Colored	7.00 to 11.00	6.50 to 12.00
Asphalt, hot (150 tons minimum), per ton delivered	33.00 to 35.00	33.00 to 35.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	33.00 to 36.00	33.00 to 36.00
Asphalt, filler, per ton	36.00	36.00
Cement, New York, per bbl	3.20	3.20
Linseed oil (raw, 5 bbl. lots), New York, per gal	.63	.78
Linseed oil (boiled, 5 bbl. lots), New York, per gal	.65	.80
White lead (100 lb. keg), New York, cents per lb	.13	.13
Turpentine (bbl. lots), New York, per gal.	.67 to .68	.65

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* These prices are f.o.b. works, with boxing charges extra.

The street car tracks were partly torn up and the electric plant put out of commission by Huertistas in 1914 and the street cars of the Mexican city have not been operated since that time. The lines will be rebuilt and power plant and rolling stock put in first-class condition, it is announced.

Public Service Railway, Newark, N. J.—The Public Service Railway will pay $1,500 as its share of the proposed improvement of Belmont Avenue, Paterson, with the understanding that the company will be relieved of any further responsibility this year. The Board of Freeholders will probably take final action shortly so that bids can be solicited for the contract and the improvement begun as soon as possible.

International Railway, Buffalo, New York.—The International Railway has agreed to undertake almost $1,000,000 worth of track improvements in Buffalo immediately. There will be no extensions under the program already outlined.

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company will superintend the laying of car track in connection with the plans of the Charlotte Construction Company to include a loop of about one mile over an area that is expected to be built up shortly with modern residences. This plan for extending the car line that now ends on East Boulevard, Dilworth, to include the above-mentioned loop and acquisition of about eighty more lots in Dilworth by the Dilworth Building Company was announced recently by E. D. Latta, of the Charlotte Construction Company, and T. T. Cole, of the Dilworth Building Company.

Kitchener, Ont.—The Kitchener Light Commission announced that the street car service will be extended to the eastern limit of the city. The commission will double-track the right-of-way some time this year.

Toronto, Ont. — The Private Bills Committee of the Ontario Government passed a bill recently permitting the city to install a cable for the civic railway at a cost of $31,650.

Philadelphia (Pa.) Rapid Transit Company. — The Philadelphia Rapid Transit Company will establish a new line on Forty-second Street from Chester Avenue to Market Street. The line will replace the Hog Island line which was discontinued when the Hog Island shipyard closed.

Dallas (Tex.) Railway.—The Dallas Railway so far has not given its approval to plans offered for relieving traffic on Main Street by taking cars off this street and rerouting them on other streets. A majority of the board of city commissioners has expressed approval of the plan and the City Plan Commission has recommended that the tracks be removed from Main Street. The Dallas Railway, however, has planned to keep its tracks on Main Street as far east as Preston Street.

Galveston (Tex.) Electric Company.—The Galveston Electric Company, which owns and operates the car lines in Galveston, has been asked in a resolution adopted by the City Commission to consider the building of an extension to serve that portion of the city known as the "West End," which includes all that portion of the waterfront and industrial district back of the wharf west of Thirty-third Street. This district could be served, it is pointed out, by the construction of a line from Broadway at Forty-first Street to Avenue G, then on Avenue G to Forty-fifth Street. Raymond G. Carroll, general manager of the Galveston Electric Company, has expressed approval of the proposed extension, declaring that he believes the service can be provided at a cost of little more than $10,000.

Wichita Falls (Tex.) Traction Company. — The Wichita Falls Traction Company announces that it soon will build another extension besides the one out Indiana Street mentioned in the ELECTRIC RAILWAY JOURNAL for May 7, but the routing of the second line has not been determined upon. Announcement that these lines would be built was made with the request for withdrawal of application for franchise for another contemplated line. The improvements will represent an outlay of approximately $100,000.

Power Houses, Shops and Buildings

Petaluma & Santa Rosa Railroad, Petaluma, Cal.—The Petaluma & Santa Rosa Railroad is installing a 300-hp. motor generator set, automatic in its operation. It is situated at the top of the grade out of Petaluma at Stony Point and is to be used in assisting heavy freight trains over the hill.

Professional Note

Allan V. Garratt, hydraulic engineer, has opened an office at 176 Federal St., Boston, Mass., for consultation and advisory work. Mr. Garratt was formerly chief engineer of the Lombard Governor Company and more recently consulting hydraulic engineer to Lockwood, Greene & Company, engineers.

Trade Notes

The Exeter Machine Works, Inc., West Pittston, Pa., has recently placed on the market a new "Exeter" rotary pump (Feuerheerd Patents).

The Automatic Boiler Cleaner Company, New Orleans, La., has placed on the market a mechanical boiler cleaner for any type and size of boiler.

C. H. Wheeler Manufacturing Company, Philadelphia, Pa., manufacturer of condensers, pumps, cooling towers, etc., is opening a new branch office in Boston on June 1 at 53 State Street, Room 613.

Standard Underground Cable Company, Pittsburgh, announces its purchase of a 12-acre tract in St. Louis on which in the near future a large plant is to be erected for the manufacture of cable and other forms of insulated wire, supplementing its four other factories. A million-dollar addition is now being made to its plant in Pittsburgh.

Pacific Clay Products Company, American Bank Building, Los Angeles, Cal., will start work on a new factory at Los Nietos for the manufacture of firebrick and refractory shapes. Larger capacity will be available than in the old plant which was recently destroyed by fire, and it is expected this will be absorbed by distribution on the West Coast.

The Steel Fabricating Corporation, manufacturer of Stefco readybuilt steel buildings, announces the completion of its new works and general offices at Michigan City, Indiana, and the removal to that city from Harvey, Ill., of its executive headquarters. The new plant, with its 175,000 ft. of additional floor space, more than trebles present capacity.

P. W. Wood, formerly sales engineer, The Buda Company, has established a railway sales agency at 811 Canal Bank Bldg., New Orleans, La. Among other accounts, Mr. Wood will handle the products of the Buda Company, the Chillingworth Manufacturing Company and the Track Specialties Company. He will also handle a complete line of track, car and overhead equipment for electric railways.

Combustion Engineering Corporation, New York City, manufacturer of mechanical stokers, furnace equipment, etc., has changed the location of its Philadelphia office to tenth floor, Finance Building. This territory is under the management of W. C. Stripe. The change was brought about by the development of business which entailed increasing the sales organization and adding a new service department, thereby necessitating larger quarters. The Philadelphia office it is stated, is now in a position to render as complete service as the home office.

New Advertising Literature

Railroad Electrification.—The Westinghouse Electric & Manufacturing Company has issued descriptive leaflet 3,450, on the Hoosac tunnel electrification, completed ten years ago.

Pinions.—R. D. Nuttall Company, Pittsburgh, Pa., is sending a letter to operating men in the electric railway industry, inclosing bulletin No. 30, dealing with drop-forged steel pinion blanks.

Cutting Metal.—Haynes Stellite Company, 30 East Forty-second Street, New York City, has issued two booklets, Vol. No. 9 and No. 10, of the Stellite Reference Library, devoted to Stellite welded-tip tools and Stellite bar stock, this product being a metal for high-speed cutting tools.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, June 11, 1921 *Number* 24

The C. E. R. A. at Work and at Play

THE railway men who live in the territory covered by the Central Electric Railway Association are fortunate in having close at hand such wonderful recreational facilities as are provided by the Great Lakes. Moreover, they make good use of these in connection with the summer meeting of the association, to be held this year as two years ago on the good ship *South American*. To any one who has taken a C. E. R. A. boat trip, the mere name connotes several restful, sociable and informational days. Those who have not been able to do so have missed an interesting experience. This year the voyage begins at Chicago on Sunday, June 26, and ends at the same place on Friday, July 1, and not a month later than this as was inadvertently announced last week.

And there's a substantial program of papers, too—a good one. They will be read in the main salon, which makes an admirable meeting room, quiet, retired and cheery. It is easier to concentrate here than in meeting rooms of the type usually available.

After All, the Things that Count Are Results

SEVERAL incidents have recently come to attention which illustrate the importance of focusing interest on the ultimate end of an operation or process, rather than upon the means which are expected to achieve the desired results. For example, in one case a manager in referring to the head of a certain department said that he was forced to engage this man almost in spite of his prejudices because he knew that the man could do things. In another case, the head of an important department, in tracing his own career, said that he had frequently been obliged to antagonize his superiors, especially when they showed a tendency to interfere with his own prerogative, but that he had always held his job because those same superiors recognized that he could get results for them more reliably than any other man within their reach.

So much for examples of a positive character; now as to the negative side. There are far too many individuals who are so fond of their pet plans for doing things that the plans to them become an end rather than a means. The consequence is that the true end is never fully accomplished. One man comes to mind, a man with a very attractive personality and excellent educational training, who seemed to be so absorbed in systems for classifying information and people and in experimenting with new devices that he was not able to get out the work of his department in the required time. The source of the trouble would seem, in this case, to be the misplacing of emphasis as to relative importance rather than to any lack of real ability.

In considering the characteristics of various shops, way departments, power plants and the like, it is evident that in their operation these illustrate the working out of one or more fundamental principles. Those which show up the best on the whole are the ones in which the prime purpose is "results." It is not necessary to adopt that fallacious old adage, "The end justifies the means," to warrant one in keeping the end always prominently in sight.

Mr. Sprague Boosts the Joint Electrification Committee Idea

ON JUNE 2 Frank J. Sprague addressed the Traffic Club of Chicago on the general and local transportation situations. Outstanding in importance among the good points that he made was the need for some kind of a national body to study the problem of steam railroad electrification in a comprehensive way. Coming at the subject from a different direction Mr. Sprague reaches the same conclusion as that stated in the last annual report of the American Electric Railway Engineering Association committee on heavy traction, wherein the recommendation was made that the national associations concerned in railroad electrification get together in some kind of a joint committee. The committee will reiterate the recommendation this year. This paper suggested editorially, in the issue for Feb. 26, 1921, that the name "American Committee on Electrification" would be appropriate. Mr. Sprague calls the central body a "Commission," which implies a wider scope than "Committee" and fits in better with his proposition.

The idea of an American Committee (or Commission) on Electrification is the result of an evolution extending over a considerable period. Electrification of the railroads is so enormous and far reaching an undertaking that almost every important branch of engineering is involved in it to a greater or less degree. Then, of course, there are the transportation interests themselves, and, in addition, the present state of semi-management of the railroads by the federal government complicates the matter still more. All of this has resulted in extensive and increasing duplication of effort, which has worried the economy-loving engineers, and they have at least called attention to the overlap. They had in mind a co-operative movement largely among engineers. Mr. Sprague goes farther and takes in the Interstate Commerce Commission, the telephone interests and others not included in the earlier plan. There is no objection to this provided the body does not become unwieldy. With a strong and effective central organization the several divisions of the field could be handled by special sub-committees.

Mr. Sprague properly suggested that the initiative in this matter come from the American Railway Association. This is the body most vitally concerned, although the general public which needs better service, electric utilities which will sell the railroads power, manufacturers who will sell them equipment, and others are greatly interested also. Mr. Sprague does not specifically mention the American Electric Railway Association in his list, but presumably includes it by inference. This body is the vehicle through which practically all of the experience in electric traction to date can best be brought to bear on the problem of electrifying the steam roads.

Can the Nickel Fare and the Graded Fare "Come Back" Together?

NEWS items announcing decreases in street railway fares are becoming more numerous. A year ago such an occurrence was almost unheard of. Fundamental economic conditions over which the street railway companies had no control have rendered general increases in charges for transportation imperative during the last few years. The nickel fare has become almost extinct. Can it ever come back?

It has been well established by the statistics of the industry that the cost of labor, fuel and supplies, not to mention taxes and other items outside of strictly operating expenses, were more than doubled since 1914. Recent decreases have been but a small fraction of that amount. Yet only in rare instances have fares been increased proportionately. Therefore it is hard to foresee wherein there is any substantial ground for expecting a general return to the universal nickel fare in the near future. This is especially true in view of the fact that the nickel was not a very profitable rate to the majority of companies even ten years ago, though all companies then did not realize this fact.

It is not unlikely, indeed, that there are still further increases to be expected for some companies. Owing to public hostility and unfavorable franchises, some companies as yet have been unable to obtain simple justice promptly and are still seeking to secure rates which the higher costs of operation of today clearly justify. But the economic pressure appears to be receding somewhat, and there are various instances of companies reducing fares on their own initiative. Notable among such cases is the action of the trustees of the Eastern Massachusetts Street Railway, reported in last week's issue. On the many lines operated by these trustees a moderate general reduction in fares has been made coincident with a decrease in the wage scale.

To a long impoverished industry the mere mention of a 5-cent fare unit may sound too far fetched even to discuss, yet certain elements of the general public are discussing it, and one need only to pick up almost any copy of the more sensational newspapers to learn that they are "demanding" it. While it is not likely that the responsible authorities will be materially influenced by the "demands" of the unthinking and the sensation seeker, nevertheless it behooves all to be forehanded in considering these matters.

There are certain advantages to the old 5-cent nickel as a fare unit, not the least of which is the casual way the average American will spend it for a phone call, a soft drink or even a short ride on the street car, whereas he is probably a little more reluctant when the expense involves some extra pennies or the use of tickets, the supply of which he has to renew at frequent intervals at an expenditure of perhaps fifty cents or a dollar. All this leads up to a renewal of the old discussion of some system of graded fares, with the feasibility and desirability of a nickel unit for a short ride. Where a company is now operating on a fare of from 6 to 10 cents, and by means of current or future reductions in wages and other costs finds itself in a position to make some reduction in fare, but not to the extent that a universal 5-cent charge would require, the alternate plan of a low fare for a short ride with a higher fare for a longer ride is worth consideration.

While several graded fare systems have been tried in the past, rather unsuccessfully to judge by their abandonment, it is obvious that the conditions are now much more favorable for such an experiment. Previous trials have all been made on the basis of the need of increased revenue, and the zone fares as established have always meant an increased fare to many, if not all passengers. But now, when a new set of conditions may permit a modified fare system on the basis of a reduction in fares to some, if not to a majority of the passengers, the chances of a successful return along these lines look distinctly better. Such an experiment, for example, is being conducted by the Boston Elevated Railway, where a universal flat fare of 10 cents was the established rate for two years, but the company is now charging only 5 cents for short rides in several suburbs of Boston. The results of the first few weeks' operation are said to have shown an increase of more than 80 per cent in the class of riders affected. While it is pointed out by the general manager of that company that an increase of 100 per cent would be necessary to give the company the revenue formerly received at the 10-cent rate, nevertheless this remarkable percentage of increase is clearly indicative of the possibilities of stimulating short haul traffic by means of 5-cent fares.

The Committee on Elimination of Waste Makes Some Suggestions

MUCH has been said in the past about the waste prevalent in America, but the reference has usually been to the waste of national resources. That industrial America has also been a spendthrift—indeed, highly inefficient in its methods—will be a surprise to some. Nevertheless this is the charge of a committee of the American Engineering Council which declares that the aggregate of the losses at least theoretically preventable runs into billions of dollars yearly. This report was presented to the Council on June 3 and its publication was authorized not as a report of the Council but as the findings of the committee. A brief summary of some of the points covered is published in this issue.

It is somewhat remarkable that in spite of the progress made in industry in many directions, the methods of engaging labor and recompensing it differ but little from those practiced in the early days when men first began to hire their services to others. Methods by which the employer who needs a certain kind of labor can be brought in touch with the man who can supply that particular kind of labor have not greatly improved. The same can be said in regard to the determination of the peculiar adaptability of the man to the work to be undertaken and the prevention of his discharge because of seasonal or other changes in the demand for the product, preventable diseases, idleness through strikes and other causes. For some of these conditions the employer is to blame, for some the employees, but for the most the cause is conditions which community sentiment and intelligence only can overcome.

The electric railway industry should profit both directly and indirectly by any comprehensive plan for increasing the efficiency of labor, reducing unemployment and otherwise increasing output. The indirect advantages include lower cost of living and greater prosperity for the community, and this necessarily means more riding. The direct advantages of increased labor efficiency are those which would apply in any business, namely, greater output per unit of cost.

The report is particularly interesting because it is an examination by an engineering body of a subject which usually has been approached not from the engineering but from the sociological side. The characteristic of engineering reports is that they deal with things in a concrete way, with definite figures, quantities and values. The committee has evidently made an effort to extend engineering methods to this particular study, and its remedies partake of an engineering nature. Thus it urges the extension of the engineering idea of standardization to such industries as the ready-made clothing industry and the printing industry, the compilation and dissemination of statistics relating to unemployment and employment needs, the scientific study of the adaptation of laborers with certain defects to their most suitable tasks and an effort to secure a reduction of seasonal fluctuations in output. The electric railway industry is founded on engineering, and the success of any attempt to extend engineering methods to other industries will be watched with interest by railway men.

The Value of Adequate Records Is Strikingly Emphasized

ONE of the principal contributing factors in minimizing the expense of the valuation of the property of the Connecticut Company by the Connecticut Commission (see ELECTRIC RAILWAY JOURNAL, May 21 and 28) was the fact that the engineers of the commission were able to base much of this work on the records of the company. This is certainly evident from an examination of Mr. Knowlton's analysis of the valuation. As remarked in the May 28 issue, this was not a weakening of the method but rather a strengthening, and it is most certainly a telling argument in favor of railway companies keeping their property records in such form that they will lend themselves to an easy and accurate analysis of the entire physical plant.

The problem of keeping property records and accounts has never been solved to the satisfaction of all who have ideas on the subject and probably never will be, but it is certainly evident that material progress has been made since the value of some sort of record began to be appreciated. Usefulness in possible, or probable, valuations is by no means the only reason for keeping such records, though the money saved for the company, in addition to that saved by the state, in one valuation might conceivably cover the entire cost of keeping the records in such shape as to be useful in such contingency. Certainly, in the continuous maintenance and reconstruction of the property of a system of any size, detailed records should prove invaluable, especially in the case of changing personnel where previous records are the only source of information to new officials.

Returning to the use of adequate records in valuation proceedings, it can hardly be denied that an accurate and up-to-date record of physical plant is a strong argument for a commission's engineering staff to use company data at a great saving of expense to all concerned. On the whole, it should be much more accurate in most details than any field inventory could ever be. In the case of track, ties, ballast and pavement, wire sizes, even, special trackwork and many other items, a record of what was installed and still exists gives more information than can easily be obtained by field examination.

Company and commission co-operation in making valuations, among other things, is getting to be more and more common. Ideas for making this co-operation most effective and mutually advantageous should therefore be welcome. In this case the concrete evidence of the value of complete records should be an incentive to railway executives to investigate their own record system with a view to its completeness and its usefulness and value in dealing with commissions and others.

Some Electrification Object Lessons from Abroad

IT HAPPENS, at the moment, that the focus of interest in electrification is shifted away from the United States to foreign lands. Although comprehensive plans are in preparation here and much important work will be done within a few years, little actual electrification can be carried out until the railroad situation clears a bit. Meanwhile a high-grade pioneer installation has been made in Brazil on which operation will soon begin, construction work is being pushed in Switzerland, and in England, and on the Continent of Europe nation-wide plans are being made. India and South Africa are also being heard from. The reduction in the cost of coal there, together with scarcity of funds, has acted to slow up the actual placing of contracts, but the urgency of early adoption of electric power is still keenly felt.

These circumstances render peculiarly timely the publication this week of several articles containing first-hand information of the Paulista electrification and the situation in Europe. From these it is evident that the electrified railroads in this country are largely in the lead in this field. The Paulista has adopted American apparatus and methods, so that the installation on its Campinas-Jundiahy section can hardly be considered foreign.

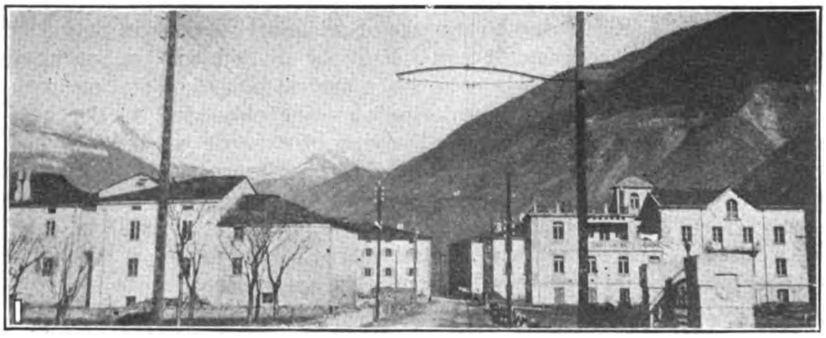
Across the Atlantic operating conditions are so different from those in the United States that comparisons can only be made with difficulty. However, able engineers and transportation men are vigorously at work there and real progress is being made. Their solutions of their problems will be of service here. And they are learning that the most economical carrying of at least certain kinds of freight involves the use of heavy tonnage trains.

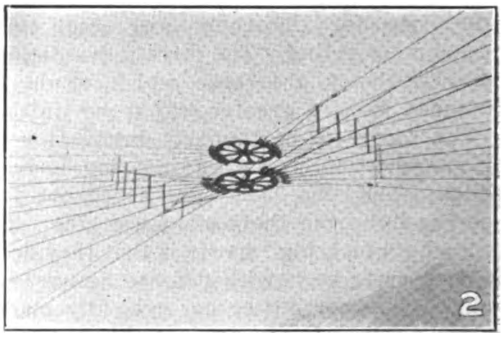
Quotation from the Federal Electric Railways Commission Report

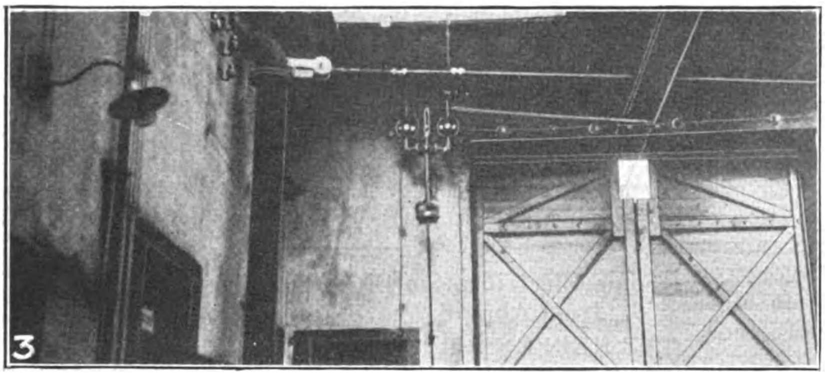
No. 24

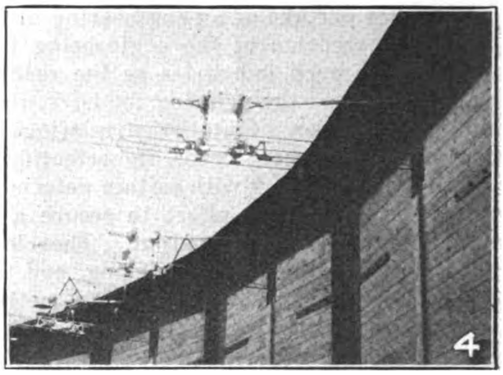
THE undisputed testimony favors an indeterminate franchise by which the company is permitted to operate subject to the right of the public to take over the property by paying its value or agreed price. Such contracts protect both the investment against confiscation and the public against extortion by providing for payment of just compensation for the use of the property. The indeterminate franchise has been most thoroughly developed in the State of Wisconsin, and it has been recognized in the District of Columbia and the States of Indiana and Massachusetts. Its earlier adoption by other states and communities would have prevented many conflicts and misunderstandings. We believe that this form of franchise should receive the favorable consideration of the public.

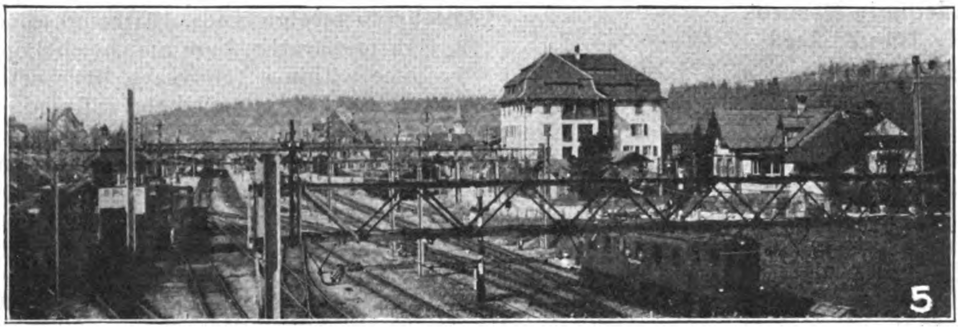
Features of Overhead and Other Electrification Details in Switzerland

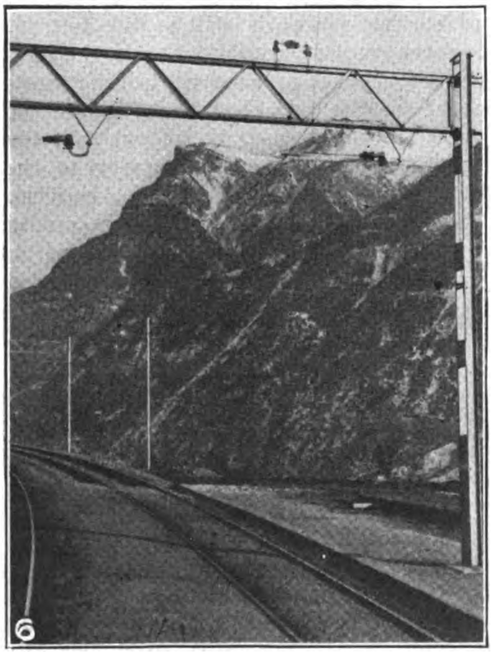


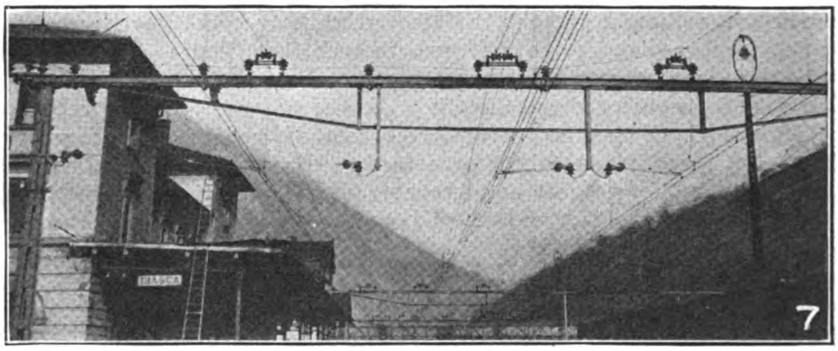


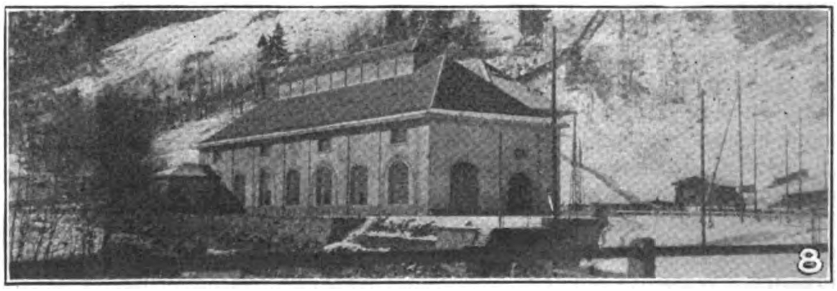












1—Some 750-volt, direct-current trolley construction on Bernina Bahn.

2—11,000-volt trolley over turntable in roundhouse, Landquart, Rhätische Bahn.

3—11,000-volt switch in roundhouse at Landquart, connecting across section break shown in the following figure.

4—11,000-volt trolley anchor and section break at roundhouse door.

5—15,000-volt, single-phase locomotive and yards at Spiez, Lötschberg Railway.

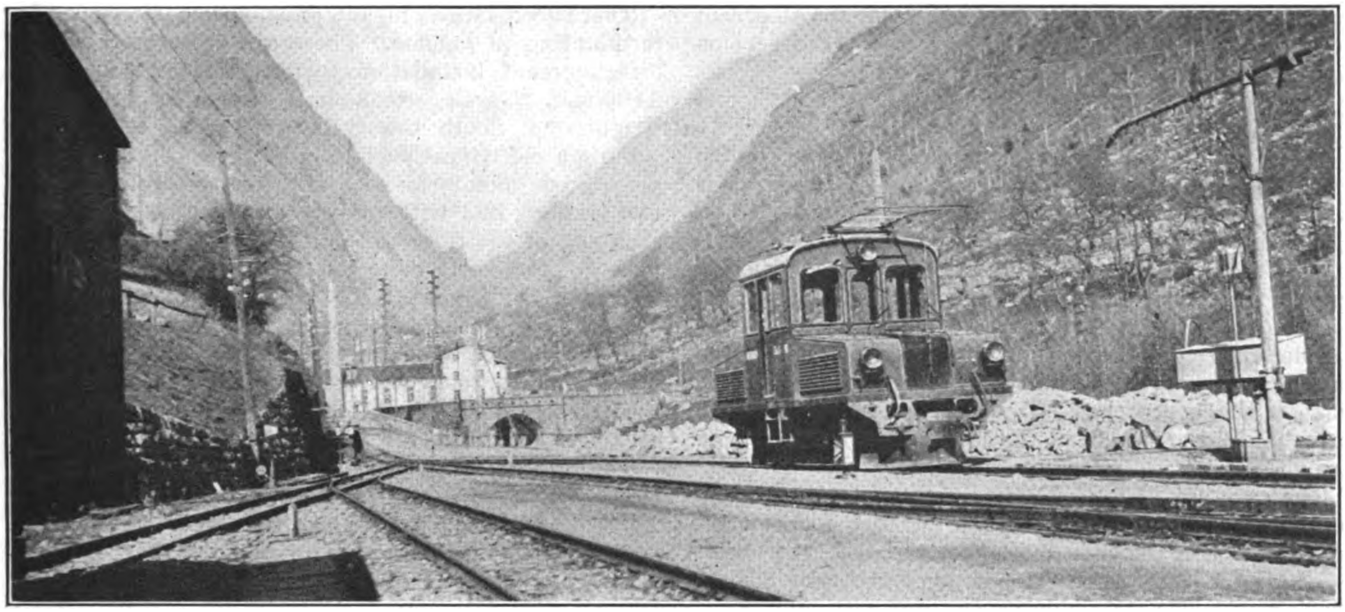
6—11,000-volt, single-phase trolley construction at station, Rhätische Bahn.

7—15,000-volt, single-phase trolley construction at Biasca, St. Gotthard Line.

8—Hydraulic power plant at Kandergrund, which under 985-ft. head generates 15,000-volt, 15-cycle, single-phase power.

Railway Electrification in Europe

BY J. V. DOBSON AND F. E. WYNNE*



A 250-HP., 5,000-VOLT, 20-CYCLE, SINGLE-PHASE LOCOMOTIVE ON THE LOCARNO-PONTEBROLLO-BIGNASCO RAILWAY, SWITZERLAND

The Authors, Recently Returned from a First-Hand Study of Transportation Conditions in England and on the Continent, Have Set Down Their Impressions of Present Practices and Tendencies in This Field—They Summarize the Points of Difference Between American and European Railway Usage

A FEW months ago the writers had occasion to make a trip through the European countries in which railroad electrification has made substantial progress or in which there is a promising field for development in this line. In the course of their travels, covering a period of two months or more, they visited England, Norway, Sweden, Germany, Switzerland, Italy and France. Some observations made on the tour are set down in the paragraphs below. Before taking up in detail the conditions noted in the several countries respectively, a summary of some of the points of novelty in railway practice, considering the trip as a whole, may be of interest. These items refer to practices noted in one or more places. They do not necessarily imply general tendencies.

SOME TRANSPORTATION FEATURES THAT ATTRACTED ATTENTION

The points of detail which we noticed particularly were these:

1. The double-deck street car for large cities.
2. The bow trolley for street cars.
3. Ball and roller armature bearings for street-car motors.
4. Rheostatic braking for street cars and locomotives.
5. The system of zone fares.
6. The three-car unit for suburban service.
7. Control equipment mounted within the car body.
8. Separate generators and transmission for heavy railway power supply.
9. Low frequency for alternating-current motive power.
10. Fifteen thousand volts on single-phase contact lines.
11. Four-thousand-volt direct-current system.
12. Tension devices, automatic or semi-automatic, for overhead contact lines.
13. Oil-cooled transformers on single-phase locomotives.
14. Regenerative braking on single-phase locomotives.
15. Manually operated control of locomotives.
16. Plate frames for locomotives.
17. Rod drive for moderate speeds.
18. Light axle-loading on cars and locomotives.
19. Light draft gear on cars and locomotives.
20. Strict observance of specified limits in loading and speed of locomotives.
21. Passenger train-heating plant not carried on electric locomotives.
22. Quality of workmanship in both manufacture and maintenance.
23. Track rails supported in chairs.
24. Permanent character of roadway structures.
25. Artistic designs of railway buildings.
26. Light-weight cars, freight and passenger.
27. Open-top freight cars for all kinds of loads.
28. Freight cars with brakes for holding only.

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*Mr. Dobson is section engineer, alternating-current railway motors, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and Mr. Wynne is manager of the railway equipment engineering department of the same company.

29. Freight cars with hand brakes only.
30. Vacuum brakes.
31. High speed of freight trains.
32. Side door compartment type passenger cars.
33. Ticket retained by passenger throughout journey.
34. Strict enforcement of laws against trespassing.

The inclusion of a practice in the above list does not indicate an opinion that it is adaptable to American conditions. Many of them, however, deserve serious consideration.

ENGLISH RAILWAYS ARE WELL BUILT

One of the most noticeable features of the English railways is the excellence of the roadbed. The track is well ballasted and well drained. The rails are carried on chairs and held tightly by wooden wedges between one side of the chair and the rail. There are practically no grade crossings, the roadways usually being carried on bridges above the railway track. Where these bridges are not entirely of stone, they are supported from heavy masonry piers with masonry wings for retaining the fills on the approaches. Of course, the roads are on private right-of-way, and the laws against trespassing are very strict and rigidly enforced.

The cars are of exceedingly light construction, most of them having only four wheels and two independent axles. Some of the later and longer cars have six wheels on three independent axles, and there are some double-truck cars. The maximum capacity of a freight car is approximately 20 long tons. The majority of the freight cars are not equipped with brakes except for holding when standing on a grade, and these brakes are set up by the crew passing along the side of the train and throwing them to the desired position. Others of the cars are provided with hand brakes operated from a small cab on the end of the car. Standard Continental couplings are used, consisting of hooks and links. Except in a few cases, the maximum working drawbar pull for this type of coupling is approximately 38,000 lb. Many of the cars are similar to our gondola type without tops. Freight which might be damaged by the weather when loaded in such cars is protected by tarpaulins drawn over the top of the load and down over the car sides. This practice greatly facilitates the loading and unloading of cars and was found to be a valuable factor in securing the rapid movement of freight during the war.

COMPARTMENT CARS ARE STANDARD

Passenger rolling stock is, of course, of the compartment type with side doors. At present, the railways are giving only first class and third class service. The cars used for third class service have the compartments extending all the way across the car with a door opening from each side. Those used for first class service have a corridor running down one side of the car, one door from each compartment opening into this corridor, and the other door located in the opposite side of the car.

In both passenger and freight service the train weights are small in comparison with those common in American main line traffic, but the speeds are high. A great many passenger trains are operated at speeds comparable with our fastest trains and the average freight train speed is considerably above ours. Interesting features of steam locomotives are the protected drivers, the use of inside rods and cranked axles, low fire boxes and small coal bins, particularly on switching engines.

In England there are no heavy electric locomotives. At present the Northeastern Railway is designing a trial locomotive of the 4-6-4 type which will weigh approximately 105 long tons with a one-hour capacity of 2,500 hp. and a maximum speed of 90 m.p.h. This engine will have quill drive, designed after Westinghouse practice, and will be given its preliminary test on the 1,500-volt, direct-current Shildon-Newport line.

There is a large amount of suburban electrification terminating in London. These are 600-volt, third-rail, direct-current installations, with the exception of the 6,600-volt, 25-cycle, single-phase system of the London, Brighton & South Coast Railway. The tendency in suburban electrification is toward three-car units, comprising one motor car with a quadruple equipment and two trailers, and with only two control stands, one at each end of the three-car unit. In the motor cars, the general practice is to mount the control equipment in a compartment immediately back of the motorman's cab and to have a baggage compartment just back of the equipment room. Generally, doors are provided between the equipment room and both the motorman's cab and the baggage compartment, providing ready access to the electrical apparatus for inspection and repair.

The preference of railway engineers seems to be for electro-magnetic control rather than electro-pneumatic. This is influenced greatly by the brake situation as vacuum brakes are much more common than the compressed air brakes.

SINGLE-PHASE OVERHEAD ON LONDON, BRIGHTON & SOUTH COAST RAILWAY IMPROVED AS TO FLEXIBILITY

On the London, Brighton & South Coast Railway the overhead is the double catenary type similar to the initial installation on the New York, New Haven & Hartford Railroad, although somewhat lighter. Recent modifications of the initial construction include: (1) The securing of flexibility by means of clips having stems passing through openings in the fittings at the bottoms of the hangers, thus permitting free vertical movement. (2) The omission of the horizontal member of the triangle which initially connected the two messenger wires.

This company has also devised a method of satisfactorily using the spool type of insulator, which at first gave trouble. The scheme is to mount the spool on a metal sleeve with tow between the spool and the sleeve and having the supporting member passing through the sleeve. The tow gives a cushioning effect, permitting unequal expansion of the porcelain and metal without producing destructive strains in the porcelain.

The London & Northwestern Railway, in combination with the Bakerloo Tube, gives a combined subway and suburban service, each of the railways furnishing part of the equipment. This is a very convenient scheme for suburban passengers living along the line of the North-Western, as they get direct service from down town to their own stations. One of the first features of street traffic noticed in England is the general use of double-deck cars, some of which have the upper deck inclosed, while others have the open upper deck similar to the bus. The bus service in London is really remarkable for its convenience, frequent service, speed and amount of traffic handled.

After observation of the operation of these vehicles through the crowded, crooked and hilly streets of London, it is evident that they give a class of service which could not possibly be approached by street cars.

As an indication of their flexibility, one frequently notices at street crossings, where the street is wide enough, three or four of these buses drawn up, side by side, waiting for the traffic officer's signal to go ahead. This is a great advantage over the necessary series position of street cars under similar circumstances.

In addition to the gasoline buses, there are now a number of gasoline-electric buses of somewhat larger capacity and which may prove to be more economical than the straight gasoline vehicles.

NORWAY IS RICH IN POWER

There are several interesting electrified railway propositions in Norway. Leaving Bergen, the Christiania-Bergen line of the Norwegian State Railways follows along the mountains beside a fjord for some distance and then continues to climb up the west slope of the main backbone of Scandinavia. The road is crooked and steep and passes through many tunnels and snowsheds. In the more rugged part of the country the roadway is not fenced. The condition of track is fair, although not to be compared with that of most English railways.

Of course, it is more difficult to maintain a good roadbed in Norway than it is in England, because the former country is subject to much wider temperature variations and a great quantity of snow.

The structures, bridges, tunnels and snowsheds along the right-of-way are of substantial character. Cars and locomotives are of the standard light construction used throughout Europe.

The traffic is comparatively light, as is indicated by the fact that only two passenger trains each way daily are operated between Bergen and Christiania. It is proposed to electrify at least the mountain section of this line as soon as it is convenient to finance the project. The features which tend to promote electrification throughout Scandinavia are that all coal must be imported, and there is abundant water power which can be readily developed. The total available water power is said to amount to 4 hp. for each inhabitant of Norway and Sweden. It is thought that the density of traffic is insufficient in itself to justify electrification.

In Christiania the street cars are mostly of the single-truck type with hand control and bow trolley and operate at the usual city speeds. The operation of the bow collectors is excellent and this is noticeable wherever this form of collector is used for street car service in Europe.

An interesting suburban installation is the Holmenkollen Railway, which starts in the outskirts of Christiania proper at a station having special provision for handling enormous crowds during week-ends and on holidays. These cars are equipped with Westinghouse motors and HL control built at East Pittsburgh. They are large, double-deck, center-entrance cars of modern design. A novel feature of these cars is that the outside is provided with hooks and straps for transporting up the hill the sleds and skis of the passengers who use these primitive vehicles for the descent by way of a steep, crooked, picturesque forest course. The regular schedule on skis is 7 miles in eight and one-half minutes.

The Christiania-Drammen line of the Norwegian State Railways is now being electrified for operation at 15,000 volts, 15 cycles, single-phase, with locomotives having side rods and geared series motors. The overhead construction will be practically the same as that which has proved its excellence on the Kiruna-Riksgränsen line of the Swedish State Railways. Power will be secured from a hydraulic plant which is one of a number to be included in a general plan of electrical generation and transmission. Probably the next step in Norwegian electrification will be the line between Riksgränsen and Narvik, 25 miles of continuous 2.6 per cent grade.

The principal traffic will be handling the cars loaded with iron ore down the grade to Narvik, which is an open port all the year, being under the influence of the Gulf Stream. At Narvik, the trains are run out on an elevated structure where the ore is dumped into vessels for transportation to England and western German ports.

It is probable that regenerative control will be required on the locomotives for this service. The general impression received in Norway is that their electrification will proceed under the guidance of competent engineers as rapidly as the necessary funds can be secured.

OVERHEAD CONSTRUCTION WELL DEVELOPED IN SWEDEN

Railway service between Stockholm and Riksgränsen is given three times per week by a mixed passenger, baggage, mail and freight train.

This railroad employs the European standard equipment. The road is good, the structure substantial and the speed moderate. The electric zone now extends from Riksgränsen to Ripats, 155 miles, and is being prolonged from Ripats to Lulea, 115 miles. The hydraulic plant at Porjus, located 34 miles from the main line, furnishes all the electric power in northern Sweden. This novel power house has been described previously in the ELECTRIC RAILWAY JOURNAL.

The present development comprises four 12,500-hp. turbines, two of which drive single-phase, 15-cycle generators, one drives a 25-cycle, three-phase generator and the fourth drives two spare generators, one of each frequency.

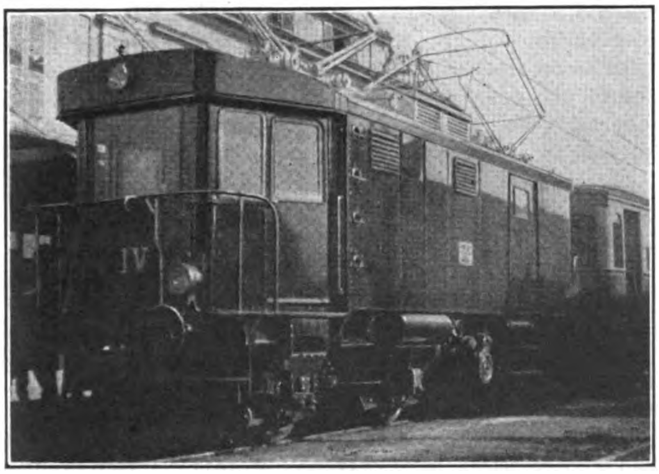
This power house is being extended and development is under way to provide for a total of 60,000 hp. at this point. The most impressive feature of the entire power station is the great amount of space; nothing is crowded and clearances are ample. This is true of the substations also. A novel feature is that all the control wiring of the power house is lead covered and carried on open racks just under the ceiling of the lower rooms.

The three-phase power is transmitted at 70,000 volts for industrial purposes. The single-phase transmission for railway service is at 80,000 volts with the middle point grounded.

In the design of the transmission lines, more than normal sag is provided for the purpose of keeping the stresses within reasonable limits under the wide temperature variations and the great weight of frost frequently present during the winter.

The trolley line construction is a remarkably good piece of work. The supports are light structural steel poles on open line and similar bridges in yards. Foundations are concrete. Insulators throughout are porcelain. All fittings are bronze. Both contact wire and messenger are copper, as are the flexible hangers.

The line is divided into sections averaging about 0.85 mile in length. Contrary to American practice, the sections are not anchored, but at each end the trolley and messenger are brought together and carried over pulleys to movable weights running in guides in the



A 55-TON, 560-HP., 4,000-VOLT DIRECT-CURRENT LOCOMOTIVE ON THE TORINO-CIRIE-VALLE DE LANZO RAILWAY, ITALY

special poles at these points. The bracket arm consists of three members arranged in form of a Z, supported at the left on two pin-type insulators and at the right supporting the messenger and trolley. The insulator pins are free to rotate about the vertical axis. The entire construction is light, flexible and reliable and its record indicates its suitability for the severe climatic conditions. In eight years of service there have been only four cases of broken trolley wires, although the temperature varies from plus 100 deg. Fahr. to minus 70 deg. Fahr., and the frost on a single wire at times weighs 1 lb. per yard.

The maximum wear on the contact wire occurs where the overhead changes grade relative to the plane of the track and shows a maximum flat of less than 0.1 in. This construction could be studied with profit by American engineers and deserves a service trial. If successful under our conditions, it would assure great economy in one of the most expensive elements of railway electrification.

Following exhaustive studies, which were begun prior to the electrification, and experimental variations in the system of distribution during operation, the Swedish engineers have concluded that the best way to correct interference in the parallel communicating circuits along this line is to use track transformers in conjunction with stub-end feed each way from each substation, the track as well as the overhead being sectionalized between substations.

The freight cars and trains on this road are the heaviest operated electrically in Europe. The double-truck ore cars weigh over 12 short tons each and have a capacity of 39 short tons, which gives a loaded car weight comparable with that of many American box cars. These cars are made up into trains of 1,500 to 2,000 tons and operated over a rolling profile with a maximum grade of 1 per cent. The line electrification is being extended to the East and in this direction loaded trains will be moved with the aid of a helper up a maximum grade of 1.6 per cent. Several types of locomotives are in service, the largest weighing about 138 tons and having a maximum starting capacity of 2,500 hp. The draw-hooks of these cars and locomotives are special, being heavier than the standard Continental type and good for a maximum operating pull of 55,000 lb. This seems small in comparison with our draw-bars, but is a substantial advance beyond general European practice.

To provide steam heat for passenger cars of the electric zone, a special car carrying the heating equipment and supply of fuel and water is attached to the train. Thus, the electric locomotives are relieved of the handicaps incident to carrying train-heating equipment in the locomotive cab, which has been American practice.

It is interesting to note that on this railway the motive-power department can order a locomotive off the road for inspection or repairs without regard to the demands of the transportation department.

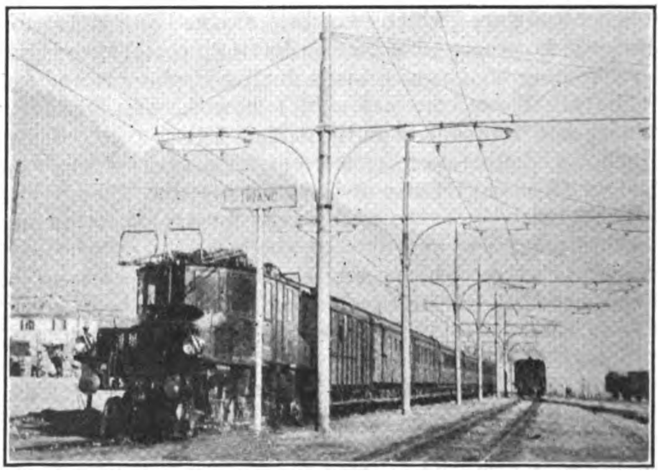
The impression produced by inspection of the Swedish State Railways electrification is that their engineers have carried through a large amount of valuable research and original design, and further notable contributions to the art of railroad electrification may be expected from this source. It is likely that the next electrification undertaken will be from Stockholm to Gothenburg.

GERMAN DEVELOPMENT HAS BEEN DORMANT

Although considerable work has been done in the last two years toward getting the German roadbeds and equipment in workable condition again, they are yet in great need of repairs. Much progress has been made in rebuilding locomotives, a large part of such work being done in the locomotive shops of electrical manufacturers. The car repairs have not been so extensive, being largely confined to the trucks; the bodies need paint, windows and doors are loose, and many of the fittings are rough iron where they were originally brass or copper. On some electric lines, the trolley wires, which were removed several years ago, have been replaced and electric service has been resumed.

Apparently, electric railway development until recently has been dormant since 1914. Some locomotive orders taken in 1913 are just being completed substantially in accordance with the original designs. However, it is noteworthy that these locomotives have commutating-pole, series, single-phase motors. This general type in a variety of forms is now the standard single-phase railway motor of Europe. There are no high-voltage direct-current railways (3,000 volts or more) in Germany. For street car service both split and box-type motors are being manufactured, but the tendency is to standardize on the box type as has been done in America.

Armature bearings of the roller type are popular and for the very small railway motors there is a tendency toward ball bearings. The inspection of several types



TYPICAL 3,300-VOLT, 3-PHASE LOCOMOTIVE AND OVERHEAD CONSTRUCTION, ITALIAN STATE RAILWAYS of locomotives under construction indicated that cab construction, equipment layout, motor mounting and method to drive are yet considered to be in the experimental stage and subject to much further development. The impression gathered from seeing the quantity of railway equipment now building, and the diligence displayed by the workmen, is that German competition with all other countries will be very keen in the near future.

ELECTRIFICATION WORK IS ACTIVE IN SWITZERLAND

Switzerland is particularly interesting, not only on account of its magnificent scenery but also because of the extent to which its railways have been electrified. The locomotives and cars are well built and maintained and the roadbed is good. Throughout Europe the great pains taken to build for permanence is striking, and in Switzerland this is emphasized by the enormous amount of labor required to overcome the natural handicaps to railway construction.

The mountainous nature of the country, of course, makes it necessary to build the railways with many grades, long and steep. The result is that no especially high speeds were observed; but on the other hand, the speeds of both passenger and freight trains on the heavy grades are higher than in America. For instance, on the Lötschberg Railway the regular speed up a grade 50 per cent steeper than that on the Pennsylvania Railroad from Altoona to Gallitzin is 35 m.p.h. and on the 3.5 per cent grade of the narrow-gage Rhätische Bahn the up-hill speed is 20 m.p.h. Another result of the ruggedness of the country is that the only way grades can be kept within reason in many places is by winding back and forth up the side of a mountain, constructing spiral loop tunnels within the mountains, and crossing back and forth between the sides of the gorges. On the St. Gotthard line of the Swiss Federal Railways there are seven spiral tunnels between Erstfeld and Bellinzona, a distance of 68 miles. On the Rhätische Bahn much of the track is located on benches cut in the vertical mountain sides.

On the Bernina Bahn a straight line will cut the track in nine places on the south side of the Alps and six of these levels may be seen from one point, the other three being higher up and on the other side of the mountain's nose. On this line the longest grade is 7 per cent for 20 miles. On light-traffic lines rack railways are used with grades up to 25 per cent, while the cable roads for tourists are on a grade of 55 per cent in places.

Long tunnels are numerous, the Simplon (13 miles) being the longest in the world. This will ultimately be a twin tube tunnel. The second bore is now approaching completion.

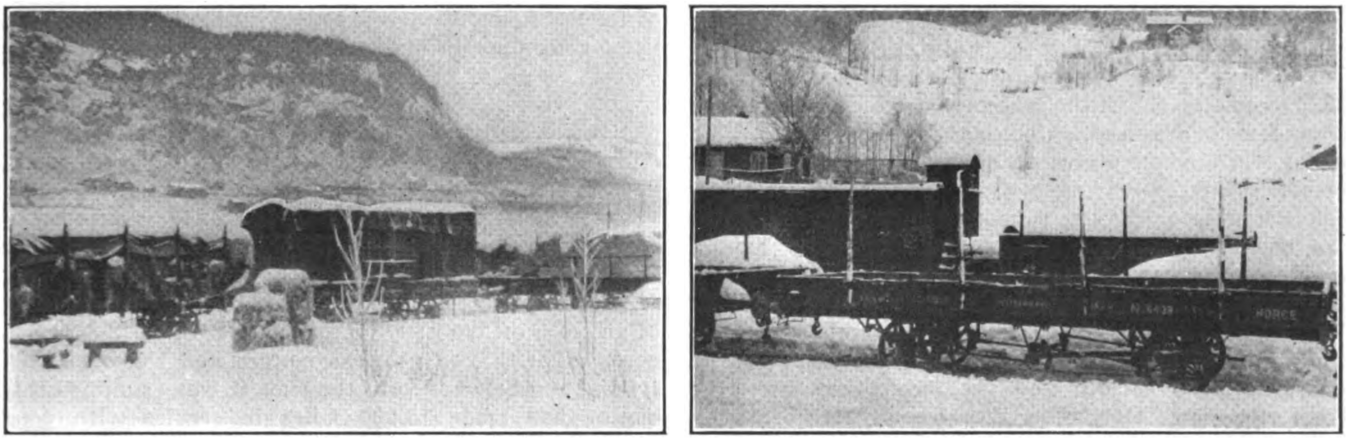
Most of the Swiss railway electrification is at 15,000 volts, 15 cycles, single-phase. However, between Bergdorf and Thun there is a three-phase line with locomotives and motor cars. The Rhätische Bahn is an 11,000-volt, single-phase line. The Bernina Bahn operates at 750 volts direct current, entirely with motor cars (with magnetic track brakes) and trailers, except for one freight locomotive. At Locarno there is a light railway, 20 cycles, single-phase, which has been operating for fifteen years. It uses 800 volts on the trolley in town and 5,000 volts in the country. The collector is a whip of pipe section, operated by a clock type spring and does very well at the low speeds.

Of course, all of the later installations use the catenary type of overhead. That on the Lötschberg Railway and Rhätische Bahn is heavier than the Swedish construction, but somewhat lighter than ours, while the St. Gotthard Line uses a light form of compound catenary and rather heavy supports, more comparable to American practice. All three of these roads use semi-automatic tension in the overhead; that is, the messenger is anchored at the ends of sections and the trolley alone is attached to the weights.

A noteworthy feature on both the Lötschberg and St. Gotthard is that the power-house generators are wound for 15,000 volts and feed directly into the trolley line, as well as through substations.

The locomotive equipments in use have nearly all been supplied by the Oerlikon and Brown-Boveri Companies, and the mechanical parts by the Swiss Locomotive & Machine Works. The locomotives are of various types of wheel arrangement, and all but one have some form of rod drive. Although the single-phase locomotives are all operated with low-frequency power, they are quite free from vibration and quiet in operation. This is largely due to the excellence of their mechanical construction and maintenance. Rod bushings, pins and bearings are made accurate initially and are set up with very small tolerances. Further, they are maintained in good condition. The maintenance cost is reasonable, if one may judge from the small number of men in the shops.

It is interesting to note that resistors for dynamic braking are located on the locomotive roof and give satisfaction in spite of the severe climatic conditions.



TWO VIEWS SHOWING TYPICAL FREIGHT CARS AND LOADING IN NORWAY

Switzerland has embarked on a definite program of electrifying all main lines on account of the scarcity of fuel and abundance of water power. The next step now under way is the line between Zurich, Lucerne and Erstfeld. Swiss engineers seem well satisfied with the gear-and-side-rod type of drive for freight and moderate-speed passenger service. For higher speed passenger service on the lines with easy grades two types of locomotives with independently driven axles are now under construction and both types will have quill drive.

ITALY IS STRONG ON THREE-PHASE

We entered Italy by way of the Bernina Bahn on Sunday, encountering a recent innovation in railway rates. In common with those of other countries, the Italian Railways have had difficulty in securing enough revenue to meet expenses. The deficit is now being decreased by charging 20 per cent excess fare for Sunday travel.

The most extensive electrification in Italy is that of the State Railways at 3,000 to 3,700 volts, 15 to 16⅔ cycles, three-phase, using double trolley with induction motors. At present the roadbed and cars are in poor condition, both maintenance and operation suffering from the difficult labor situation, but the locomotives are well maintained.

This system has in operation and on order a total of 222 locomotives. Although various forms of wheel arrangement are used, all engines have rod drive. Line voltage is applied direct without transformers to the primaries of the driving motors. For speed variation, pole-changing or cascade connections, or both combined, are used. These locomotives are notable as having greater power per unit of weight than any other electric locomotives built to date.

Some locomotives are equipped with liquid rheostats, while others have metal resistors. In general, the acceleration is smooth and the locomotives are free from vibration. Of course, these locomotives brake by regeneration automatically on down grades. As severe grades are numerous in the electrified zones, this feature is a valuable asset.

The double overhead construction is a handicap to this system. Originally direct suspension was used for the trolleys, but later installations employ catenary suspension. With the direct suspension construction, it has been found necessary to replace the contact wires in tunnels every three years and on open line at the end of nine years. Maximum wear occurred at the hard spots formed by the suspension clips. Although the double overhead construction is expensive and complicated, its operation and that of the pantograph collectors are successful at 3,300 volts. It is proposed to continue the electrification of the State Railways in the north of Italy with this system on account of the many heavy grades. For southern Italy, where service conditions are much easier and where 42 cycles is the prevailing frequency, plans are under way for experimental lines with both high voltage, direct current and 42-cycle, three-phase power.

The results obtained on these experimental lines will serve as a guide in selecting the system for the south of Italy.

Since the first of this year the Torino-Cirie-Valle de Lanzo Railway has been operating three 55-ton (2,000 lb.) 560-hp. truck-type, box-cab locomotives with axle-mounted geared motors and manually operated control from a 4,000-volt, direct-current trolley fed by a 1,300-kw. substation located at Cirie.

The driving motors are grouped two in series and the groups arranged for series-parallel operation and rheostatic braking. In addition to providing two enginemen's compartments and housing the control and auxiliary equipment (excepting compressor), the box cab also has space for a small baggage compartment. The motors have natural ventilation and the resistor is cooled by a fan driven by the motor-generator which supplies low-voltage current for the compressor and lights.

The service given comprises sixteen passenger and eight freight trains daily. The total train weight is 121 short tons. Initial operation has been very satisfactory. Minor defects which appeared in the motors have been corrected and some of the switching apparatus has been modified. Twenty-five short circuits on the trolley line have failed to flash the power generators, even when occurring in front of the substation.

LARGE PLANS FOR ELECTRIFICATION IN FRANCE

In France the Paris-Orleans Railway has a number of 600-volt, direct-current electric locomotives of the double-truck type with axle-hung motors, operating out of Paris. Some of these locomotives have box cabs with baggage compartments, and others have the steeple type of cab, seven of the latter having been in service for twenty years. The performance of these locomotives has been very good. They are inspected once a week, and at the end of 20,000 miles are out of service three days for overhauling. The life of motor windings is ten years, which is an evidence of the good results to be secured in general from electrical apparatus by imposing upon it only such duty as is within its capacity.

This railroad has recently placed in service the first of an order of five 1,800-hp. locomotives of the 2-8-2 type, equipped with two gearless motors and the open "V" type of rod drive. Up to the time it was examined this engine had made 12,000 miles in service with good results. Field control motors are used and a novel feature of this equipment is that the short field connection is controlled by a separate handle on the master controller.

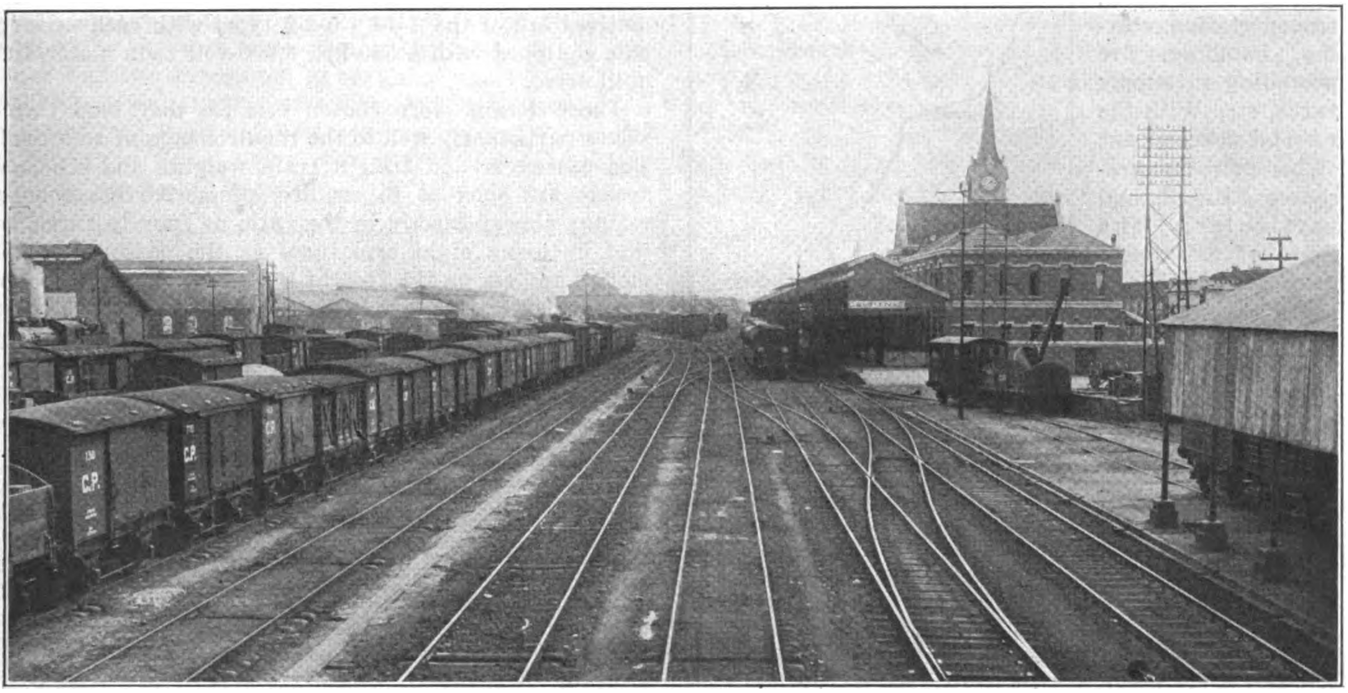
The Midi Railway is in the process of changing its electrified zones from single-phase to 1,500 volts direct current in order to conform to the adopted standard system for France. For use in this connection sixteen 1,200-kw., 1,500-volt mercury rectifiers have been ordered. These will be located in the existing transformer station buildings and will be operated in parallel with other substations containing synchronous converters.

The State Railways (formerly the Western Railway of France) employ some of the heaviest suburban equipment in Europe. One type of motor car, weighing 63 tons, has two-axle trucks and a double equipment of 225-hp. motors. Another type, weighing 72 tons, has a quadruple equipment of 165-hp. motors, two of the motors being mounted on each three-axle truck. This road also has ten 800-hp. gearless locomotives with an early form of quill drive.

As in England, there is a tendency to the use of the three-car unit (one motor car and two trailers) for suburban service. It is planned rapidly to extend the multiple-unit electric service around Paris, and a definite program of main line electrification also has been started.

3,000-Volt Electrification on Paulista

Initial Installation on One of Brazil's Crack Railroads Now Practically Complete—Details of Locomotives, Substation and Power Distribution System Are Given by Engineers of American Manufacturers Who Supplied Equipment—This Pioneer Undertaking Is Forerunner of an Extensive Application of Electric Motive Power in Brazil



STATION AND YARD AT CAMPINAS, THE NORTHERN END OF THE PRESENT ELECTRIFICATION

THE most notable electrification project on this continent during the past two years is that of an important section of the Paulista Railway in Brazil. Within a few weeks the new equipment will be in operation. While brief notes regarding the Paulista have appeared in the ELECTRIC RAILWAY JOURNAL from time to time, it is only now possible to present a comprehensive statement of the electrification. To this end the editors requested two engineers, of the General Electric Company and the Westinghouse Electric & Manufacturing Company respectively, men who are familiar with the details, to discuss the subject with respect to the work done by these two companies. The following two articles are the result. The General Electric Company is supplying eight freight and four passenger locomotives, the substation equipment and the line material and is doing all of the erection work. The Westinghouse company is furnishing two passenger and two freight locomotives. All of this, together with much general information regarding the railroad itself, is covered exhaustively in the articles. As Mr. Cooper's article includes an account of the conditions under which the Paulista Railway operates it is placed first.—EDITORS.

The Paulista Railway and the Westinghouse Locomotives

By S. B. COOPER

General Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

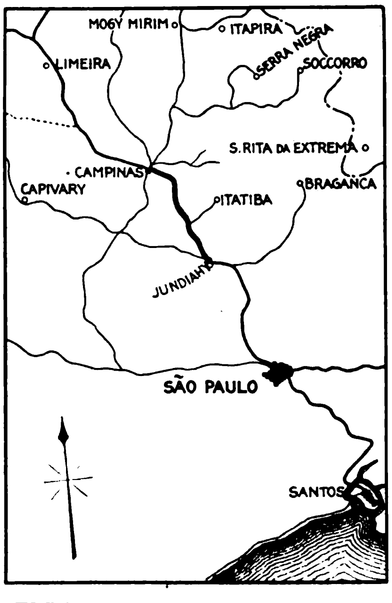
THE Companhia Paulista de Estradas de Ferro is about to begin electric operation over a 28-mile section of double track on its main line between Jundiahy and Campinas, Brazil. This marks the initial step in what is expected to become a broad program of electrification in Brazil, with the ultimate aim of substituting hydro-electric power for expensive coal.

Brazil's supply of native coal is not abundant; it is located in southern Brazil at some distance from the principal consuming centers and is of comparatively poor quality. It is high in sulphur and ash and, although some experiments have been made along the lines of preliminary treatment and pulverization, railroad men there are convinced that it cannot be considered a satisfactory fuel.

Some years ago, when the South American countries were essentially producers with a comparatively small consuming capacity, ships bound from the United States and Europe to South America for cargoes of cereals, meats, coffee, hides, etc., were able to carry coal at comparatively low rates on outbound voyages. Coal could be landed in Rio de Janeiro or Buenos Aires for $6 or $7 per ton. Since that time, however, the development of these countries has been phenomenal—their consuming capacity has increased with the development of their resources and industries, so that high-class outbound cargoes are available. The world-wide shortage of ships caused by the war has raised ocean freight rates enormously and these two factors, combined with the increased coal prices at the mines, have caused the price of coal to reach almost prohibitive figures.

WOOD BURNED EXTENSIVELY ON LOCOMOTIVES

During the war it was almost impossible to obtain coal at all, except in very limited quantities at exorbitant prices, so that many of the Brazilian railroads, the Paulista among them, fell back on wood as locomotive fuel. Brazil has, of course, a wonderful supply of hard woods that make excellent fuel, but even Brazil could not keep up with the demand for wood fuel for her railroads, at least from sources within commercially practicable distances of the lines. Furthermore, for a given calorific value wood fuel requires a comparatively large amount of labor in cutting, transportation, storing, handling, fire patrolling in supply yards, etc. With the rapid development of her marvelous resources, Brazil, and particularly the State of São Paulo needs labor badly. I heard the statement made in 1917 that there were 15,000 men in the State of São Paulo engaged in getting out wood for the railways.



ELECTRIFIED SECTION OF THE PAULISTA AND CONNECTIONS

The topographical and climatic conditions are such as to give abundant water power. A sharp mountain range, the Serra do Mar, rises practically at the seacoast, reaching a height of 2,000 to 2,500 ft. or more within a very short distance from the ocean. From this range the drainage is, in general, toward the northwest, with a gradual fall into the Paraná River, which thence flows south, emptying into the Atlantic Ocean through the Rio Plata at Buenos Aires. The State of São Paulo is semi-mountainous, with abundant rainfall, and is crossed by several fairly large rivers with frequent falls and without excessively low water periods.

What then could be more logical than the utilization of this abundant native power instead of inferior or expensive coal? The officials of the Paulista company have made careful studies, during the last four years, of the possibilities of electrification, and in the spring of 1920 placed their orders for the equipment necessary for the electrical operation of the 28 miles of double track between Jundiahy and Campinas.

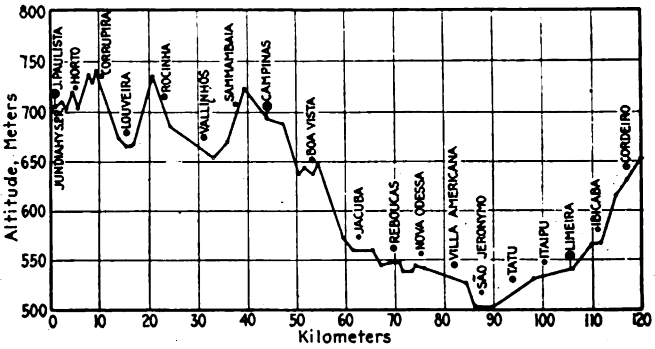
PRESENT ELECTRIFICATION IS BUT THE BEGINNING

Jundiahy is the southern terminus of the Paulista system, where it joins and exchanges traffic with the São Paulo Railway, the English owned line running to Santos. Campinas, one of the most important centers of this wonderfully rich state, is the terminus of the Mogyana Railways, an extensive meter-gage system, covering the northern portion of the state. The Mogyana traffic is transferred to Paulista broad-gage (1.6 meters, or about 5 ft. 3 in.) cars at Campinas, for movement over the Paulista and São Paulo Railway lines to Santos, so that the section now being electrified is the one of heaviest traffic on the Paulista system. It is planned to extend the electrification in the near future beyond Campinas, and it is probable that eventually the entire broad-gage main line will be electrically operated.

The Westinghouse Electric International Company is furnishing two freight and two passenger locomotives for this initial electrification. The freight locomotives are of the six-axle type, with two six-wheel articulated trucks. There are six axle-mounted motors rating 280 hp. at the one-hour rating. Each motor is wound for 1,500 volts for operation two in series on 3,000 volts and is arranged for field control. Each motor drives its axle by a single flexible gear. The passenger locomotives are of the 2-4-0+0-4-2 type, with each driving axle equipped with a 560-hp., 3,000-volt twin motor and quill drive.

These details were chosen because they lend themselves particularly well to the requirements of this road. The passenger and freight train weights and schedule speeds are such as to require locomotive horsepower ratings almost exactly in the ratio of four to three, so that by using eight armatures on the passenger locomotive and six on the freight locomotive it was possible to use identical motors in both services, except for the external frames. The passenger motors are in twin frames, while the freight motors are in axle and nose-suspension frames, but the motors are identical electrically, and all replacement parts, coils, complete armatures, field poles, brushes, armature bearings, etc., are interchangeable throughout. This operating advantage is obtained without the sacrifice of fitness of type of each engine for its service. The freight locomotives, operating at speeds up to 40 m.p.h. with comparatively light axle loads, have the mechanical simplicity inherent in axle-mounted motors and direct-geared drive, while the passenger locomotives for speeds up to 65 m.p.h. have the advantages of high center of gravity and large proportion of spring-borne weight given by the quill drive, so desirable in high-speed service.

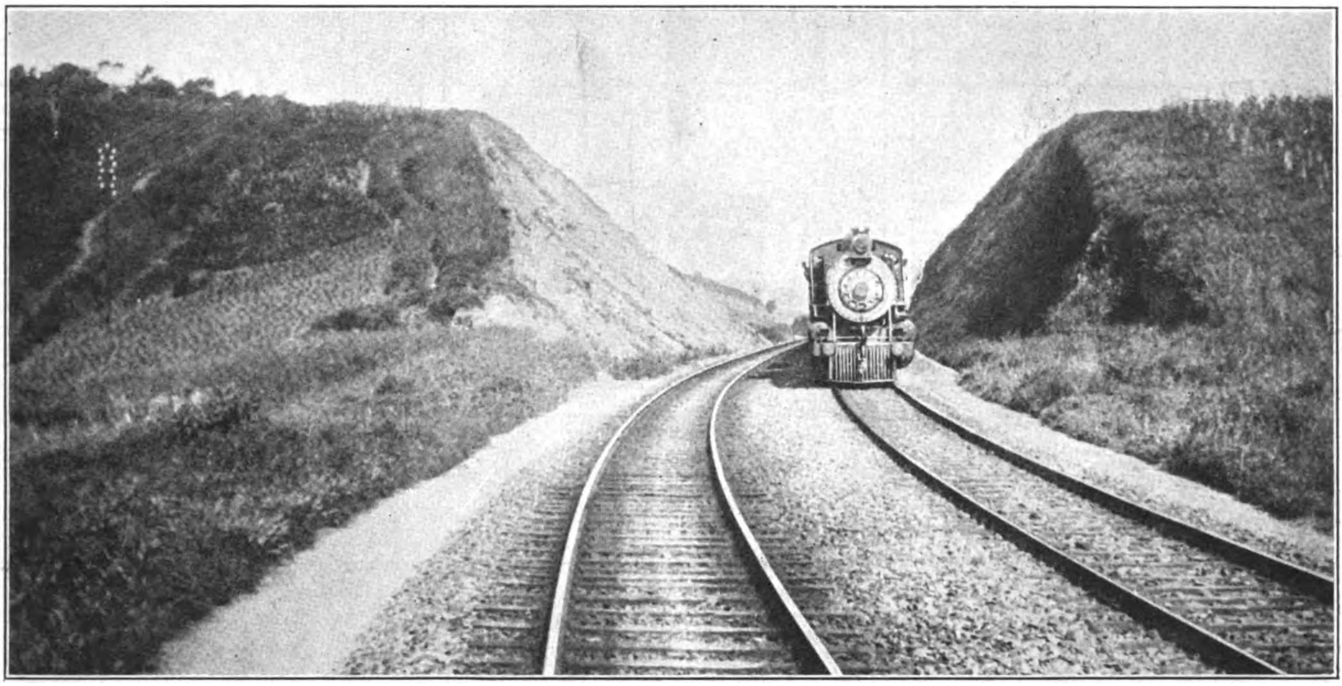
Mechanical practice on the Paulista, as on many South American railroads, follows European rather than American lines, and their standards of mechanical workmanship and maintenance are higher than those followed on North American roads. Every effort was made in the design of these locomotives to meet these high standards of mechanical practice. The frames are of solid slab steel with the openings drilled and burned out by torch. The brake rigging and equalizer parts are fitted with case-hardened pins and bushings throughout, thus minimizing wear and facilitating replacement. The pedestal shoes are of bronze and the journal boxes are arranged for grease lubrication of the hub liners.



PROFILE OF TRACK ON THE PAULISTA RAILWAY NORTH FROM JUNDIAHY

The control equipment has been worked out to give the greatest possible degree of simplicity consistent with operating flexibility, including the Westinghouse system of unit switches. All switches required to break heavy currents are of the unit type mounted in two rows just below the main grid resistors. Motor combination circuits for motoring and regenerating are set up by cam switch groups and stabilizing resistor connections for regeneration are made by smaller unit switches without blowout coils.

The Paulista uses the Continental type of coupler with take-up screws on the passenger cars, but only open links on the freight equipment. For this reason it is particularly desirable to have a high degree of flexibility and smoothness in the control. This is accomplished by having three motor combinations of six, three and two armatures in series on the freight locomotives, giving, with field control notches, six running speeds. The main handle on the master controller has eighteen positions, giving a total of fifty-four notches. On the passenger locomotives the armatures are connected eight, four and two in series, giving six running speeds and fifty-four notches.



A SAMPLE OF THE WELL-CONSTRUCTED TRACK THAT IS BEING ELECTRIFIED ON THE PAULISTA

Regeneration is provided for in all three combinations, with thirteen notches in each combination, giving a particularly wide range of regenerating speeds, a most desirable feature with the various classes of trains and varying grade conditions existing on the Paulista.

In the auxiliary equipment a single high-voltage auxiliary motor-generator set furnishes power for control, lights, motor excitation during regeneration, for blowers, compressor and vacuum exhauster. The motors driving the exhauster and blowers are practically identical. The control and auxiliary equipment throughout is the same on the freight and passenger locomotives, excepting for such detailed differences as are required for the control of six and eight armatures respectively. The brake equipment consists of a combination of air and vacuum brakes. The space requirements for the cylinders made it impossible to use vacuum brakes on the locomotives, so they are equipped with air brakes. The control of the brakes is so arranged that air on the locomotive and vacuum brakes on the train are handled from a single valve with uniform rates of application and release. An independent straight air valve is provided for the separate control of the locomotive brakes as desired, thus making it possible to shut down the exhauster during light engine or switching movements.

TABLE I—GENERAL DATA OF WESTINGHOUSE LOCOMOTIVES

	Freight	Passenger
Type of truck	0-6-0+0-6-0 Articulated	2-4-0+0-4-2 Articulated
Rigid wheelbase	14 ft. 0 in.	8 ft. 4 in.
Total wheelbase	37 ft. 0 in.	41 ft. 2 in.
Length over buffers	50 ft. 2 in.	52 ft. 11 in.
Total height over cab roof	12 ft. 7 in.	12 ft. 7 in.
Total height with pantograph down	14 ft. 10 in.	14 ft. 10 in.
Diameter of driving wheels	40 in.	63 in.
Total weight, short tons (2,000 lb.)	116.6	140.8
Weight on drivers, tons	116.6	101.8
Motors	6 — No. 350	4 — No. 351
Gear ratio	16:63	28:86
One-hour rating, per motor	280 hp.	560 hp.

The traffic on the Paulista system is growing at a very healthy rate and even with double track it will not be many years before track capacity becomes a serious consideration. It seems probable that by that time both the São Paulo and Paulista Railways will change over to M. C. B.-type couplers, enabling them to handle much larger trains. With this end in view, these locomotives have been equipped for multiple operation so that they can be double-headed with a single crew and handle 1,540-ton (2,000-lb.) instead of 770-ton trains. The bumper castings have been so designed that M. C. B. couplers can be readily applied.

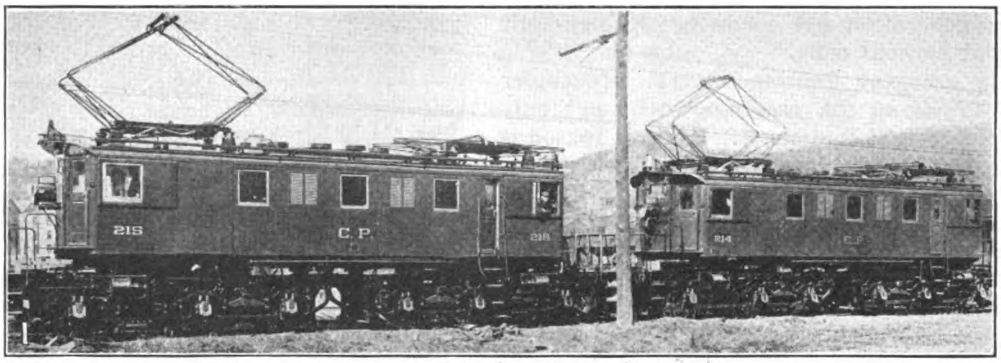
The more important ratings and dimensions of the two types of locomotive are shown in Tables I and II. Ratings are on the basis of the A. I. E. E. rules throughout, the continuous rating being based on 80-deg. C. rise by thermometer, or 105-deg. rise by resistance, thus giving conservative total temperatures with the high air temperatures encountered at certain seasons in Brazil.

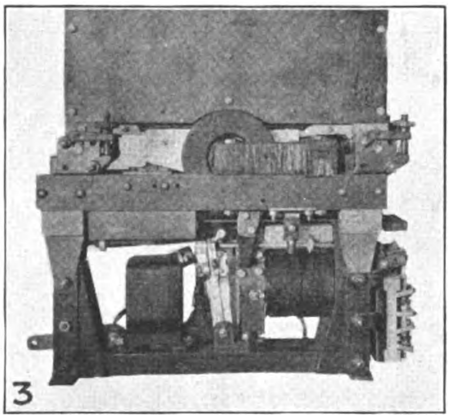
TABLE II—WESTINGHOUSE LOCOMOTIVE RATINGS—SHORT FIELD

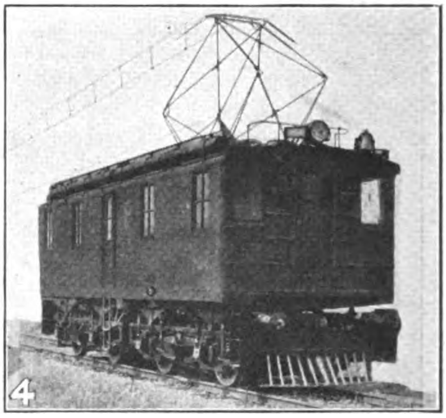
One-hour rating, horsepower	1,680	2,240
Tractive effort, pounds	29,400	19,400
Speed, miles per hour	21.4	43.2
Continuous rating, * horsepower	1,350	1,800
Tractive effort, pounds	21,600	14,300
Speed, miles per hour	23.4	47.2
Tractive effort at 25 per cent adhesion, pounds	58,500	51,000
Maximum safe speed, miles per hour	40	65

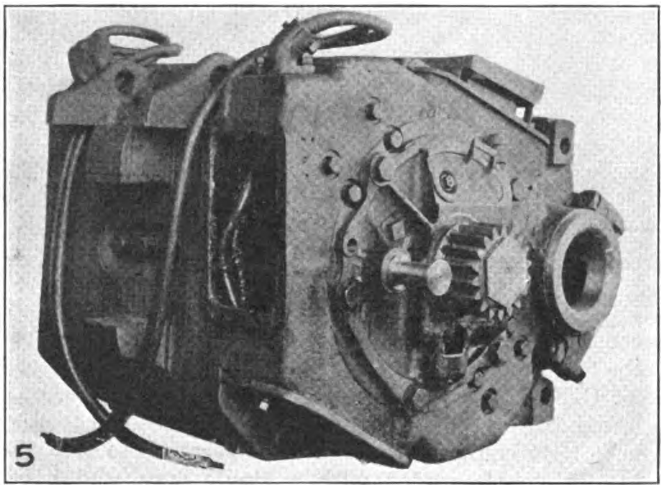
* A.I.E.E. Standardization Rules, 80-deg. C. rise by thermometer; 105-deg. C. rise by resistance.

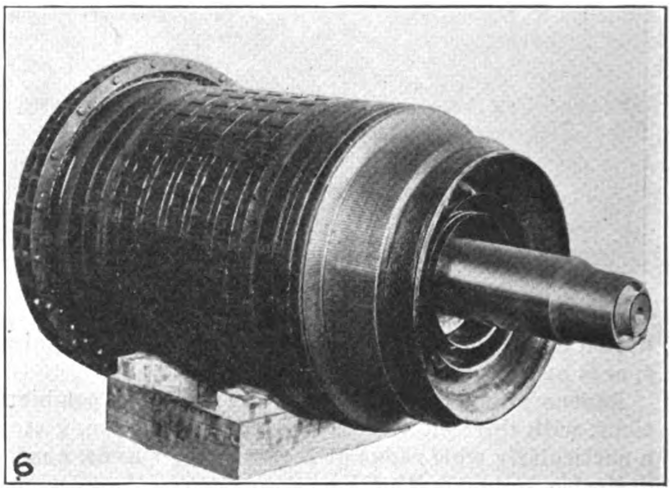
Paulista Electric Locomotives and Important Parts of Their Electrical Equipment

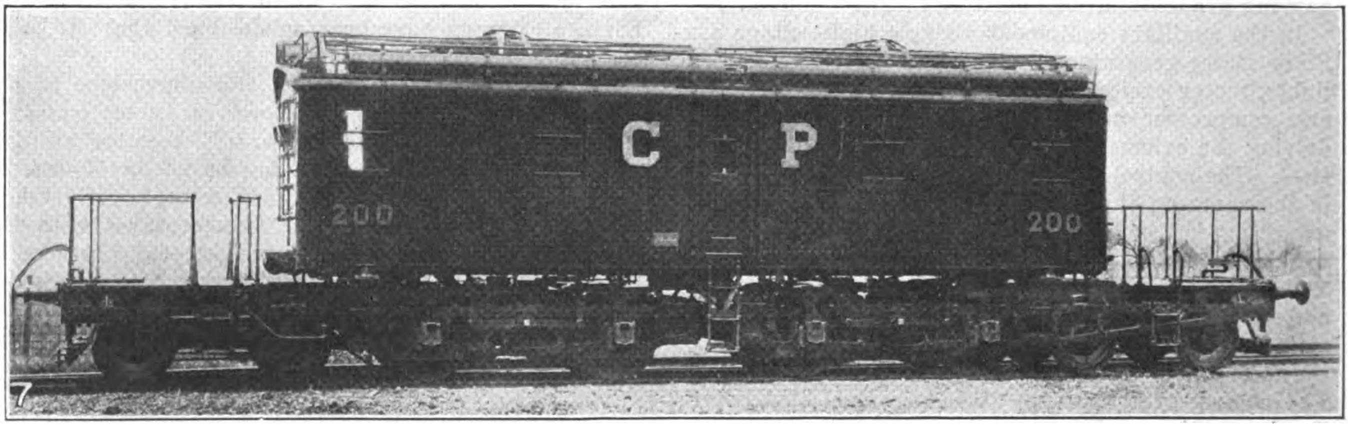






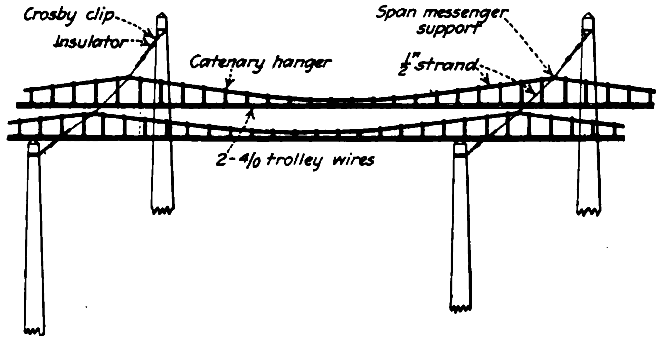






1—The Baldwin-Westinghouse freight locomotive.
2—End view of same locomotive, showing Continental coupler.
3—High-speed circuit-breaker used on the General Electric locomotives.
4—The General Electric freight locomotive.
5—Commutator end of G.E. motor, Type 267, Form A.
6—Armature for GE-267A motor.
7—The 120-ton General Electric passenger locomotive.

The shipment of these locomotives involves some interesting features. Each cab is completely housed in after being mounted on a heavily framed platform. The housing consists of a double lumber sheathing interlaid with heavy waterproof building paper. Each truck complete with its motors and gears mounted in place is similarly boxed and two additional boxes per locomotive carry the pantograph trolleys. The truck and pantograph boxes are loaded in the ship's hold and the two cabs are carried on deck, one on either side of the main hatch, securely bolted and lashed in place. After unloading and unboxing, it will only be necessary to set the cab on the trucks, mount the pantographs and connect up the motor leads and brake connections and the locomotive will be ready for service. By the time this article is printed the freight locomotives will probably have been landed in Brazil. The passenger locomotives are now approaching completion in the East Pittsburgh works of the company.



DIAGRAMMATIC SKETCH OF DOUBLE-TRACK, CROSS-SPAN CATENARY ON TANGENT

The General Electric's Contribution to the Paulista Electrification

By W. D. Bearce
Railway and Traction Engineering Department, General Electric Company, Schenectady, N. Y.

THE concluding shipments are being made on the $2,000,000 contract with the International General Electric Company in connection with the electrification of the Jundiahy-Campinas section of the Paulista Railway.

The motive power equipment being furnished by this company consists of eight freight locomotives weighing 100 tons (2,000 lb.) each and four passenger locomotives weighing 120 tons each. Work has been progressing on these locomotives for about a year at the Erie works and the first locomotive was put on the test track about the middle of March. Complete running tests were made and two freight locomotives were shipped before the middle of May. One of the passenger locomotives was also put on the test track and shipment was made, according to schedule, during May.

In addition to the locomotives, the contract included the equipment of a complete 3,000-volt, direct-current substation of 4,500-kw. capacity, comprising three 1,500-kw., three-unit motor-generator sets, transformers, switchboards and high-tension equipment. Overhead line material has also been furnished for 76 miles of track and material for about 10 miles of 88,000-volt, three-phase, 60-cycle high-tension transmission in duplicate from the lines of the São Paulo Light & Power Company.

The line from Campinas to Jundiahy is a main line section connecting at the southern terminus with the São Paulo Railway and the Central Railway of Brazil. The Central Railway is government owned and electrification of this line has also been authorized. At Campinas and other points north connection is made by the Paulista Railway with a number of feeder lines, which bring large quantities of coffee and other raw material from the interior.

The road is rock ballasted and the construction throughout is equal to any of the main-line roads in the United States. The track gage is 5 ft. 3 in. on the section to be electrified, but some of the connecting lines are narrow-gage and facilities are provided for transferring the car bodies complete with merchandise to narrow-gage trucks and vice versa. The passenger service includes high-speed passenger trains with full Pullman accommodations. The present locomotive equipment consists of heavy-type locomotives for freight service with high-speed engines for passenger service. All are equipped for burning wood. The variety of wood most used is known as quebracho, which gives satisfactory results except that, of course, the quantity required for a 100-mile run is very bulky. Recently there has been difficulty in procuring even wood that is suitable for this work.

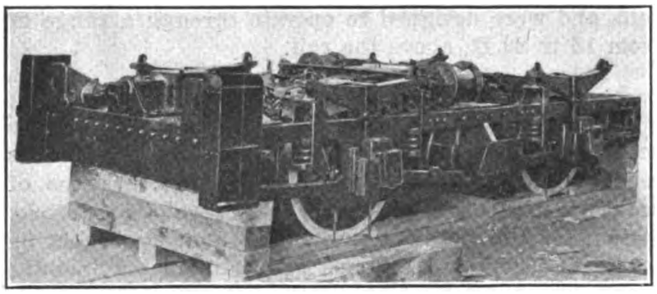
ENORMOUS TONNAGE HANDLED ON SECTION BEING ELECTRIFIED

The section selected for electrification presents a rather difficult profile, including maximum grades of 1.5 to 1.8 per cent. While the immediate plans of the Paulista company contemplate electrification for only a distance of 73 miles, the design and capacity of all apparatus and equipment are suitable for operating on an extension to São Carlos, a total distance of 128 miles. The approximate traffic handled over this line during the year 1918 from Jundiahy to Cordeiro was about 275,000,000 ton-miles, including freight, passenger and non-revenue service. The electrical equipment is designed for handling approximately double this amount, as is also the substation and line equipment. As a basis for estimates it was assumed that the number of trains per day over the initial electric zone will be six passenger and twenty-one freight in each direction, making a total of fifty-four trains per day.

LOCOMOTIVE DESIGN FOLLOWS UNITED STATES MODELS

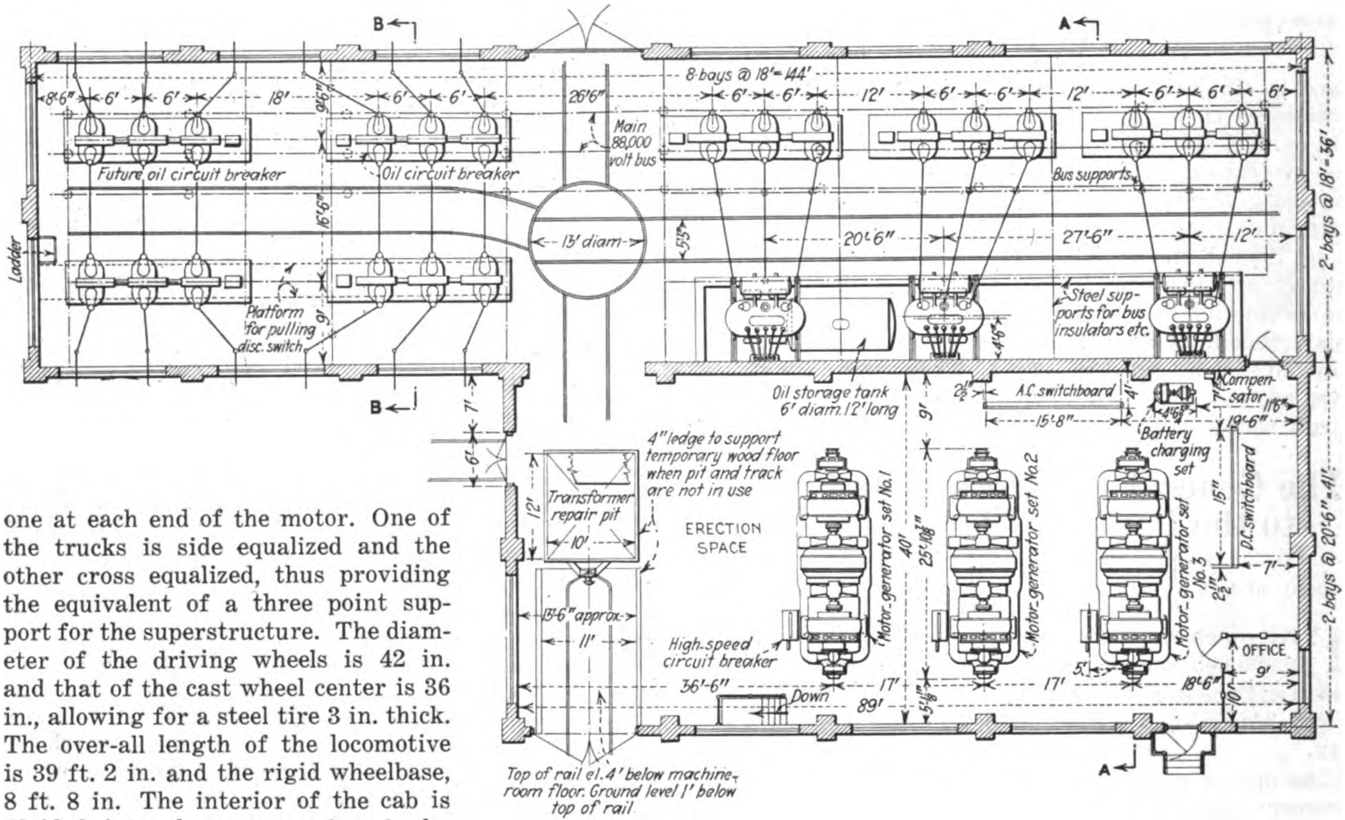
The initial order for locomotives included eight freight and four passenger, all of the twin-geared type. These are similar to those in successful use in the United States on the Chicago, Milwaukee & St. Paul, the Butte, Anaconda & Pacific, the Michigan Central (Detroit River tunnel) and other roads.

The freight locomotives weigh 100 short tons, all weight being on the driving axles. They are designed



TRUCK OF THE GENERAL ELECTRIC 100-TON FREIGHT LOCOMOTIVE for handling a trailing train of 770 short tons on the maximum 1.8 per cent grade at speeds of from 12 to 16 m.p.h. The maximum allowable speed on tangent level track is 30 to 35 m.p.h. It is expected that because of the greater capacity and higher speed characteristics the electric locomotives will provide an appreciable improvement over the existing steam service, both as regards schedule speed and weight of trains handled.

The freight locomotive has a running gear consisting of two two-axle trucks coupled together by an articulated joint, and a single cab of the box type. The draft gear is mounted on the trucks, and all hauling and buffing stresses are transmitted through the truck frames and articulated joint, thus eliminating any possibility of damage to the cab and platform structure. Each truck is equipped with two GE-267 motors of the box-frame type, geared to the driving axle by two sets of gearing, one at each end of the motor. One of the trucks is side equalized and the other cross equalized, thus providing the equivalent of a three point support for the superstructure. The diameter of the driving wheels is 42 in. and that of the cast wheel center is 36 in., allowing for a steel tire 3 in. thick. The over-all length of the locomotive is 39 ft. 2 in. and the rigid wheelbase, 8 ft. 8 in. The interior of the cab is divided into three compartments by partitions or bulkheads so placed as to form two end compartments about 5 ft. in length for the operator's cabs and the remainder for housing the control equipment, compressor-exhauster set and other auxiliary apparatus. Two pantograph trolleys, of the double-pan sliding type similar to that used in other heavy electrification projects, are mounted on the cab roof. These are insulated for 3,000 volts and were designed to operate through a range of from 15 to 22 ft. above the rail.


B
B
A
A
Ladder
8'-6"
6'
6'
18'
9'6"
6'
6'
26'6"
Main 88,000 volt bus
Future oil circuit breaker
Oil circuit breaker
16'6"
13' diam
Platform for pulling disc. switch
9'
7'
6'
8 bays @ 18' = 144'
6'
6'
12'
6'
6'
12'
6'
6'
6'
Bus supports
5'3"
20'-6"
27'-6"
12'
Steel supports for bus insulators etc.
4'6"
2-bays @ 18' = 36'
Oil storage tank 6' diam. 12' long
9'
2½"
A.C. switchboard
4'
15'-8"
4'6¾"
7'
Compensator
11'6"
19'-6"
Battery charging set
4" ledge to support temporary wood floor when pit and track are not in use
12'
Transformer repair pit
10'
ERECTION SPACE
Motor-generator set No.1
40'
25'10⅞"
Motor-generator set No.2
Motor-generator set No.3
15"
2½"
D.C. switchboard
7'
2-bays @ 20'6" = 41'
13'6" approx.
11'
High-speed circuit breaker
36'-6"
17'
17'
5'
18'-6"
OFFICE
9'
10'
Down
89'
5'1⅛"
Top of rail el. 4' below machine-room floor. Ground level 1' below top of rail

PLAN OF THE LOUVEIRA SUBSTATION, CONTAINING THREE 1,500-KW. M. G. SETS

TWO TYPES OF BRAKE NECESSARY

To conform to the equipment on this road it was necessary to provide control for the vacuum type brakes used on the cars. Two entirely different systems of brakes are therefore provided for—a straight air brake system for the locomotive and vacuum-type brakes on the train. The two systems are manipulated like the usual all-compressed-air type, the locomotive brakes being applied automatically simultaneously with the train brakes under normal running. Brakes can be applied on the locomotive alone or on the train alone if desired. During regeneration, however, a magnet valve insures that straight air cannot be applied while power is being returned to the trolley. However, should an emergency application be made, regeneration is discontinued and the brakes are applied on the locomotive.

WIDE GAGE PERMITTED USE OF MOTORS OF SELF-VENTILATING TYPE

The motors are of the box-frame commutating-pole type designed for self-ventilation, made possible by the ample room due to the wide gage. To supply clean air for ventilation of the motors, a ventilating pipe is provided, reaching to the outside of the locomotive truck. The fan is of the multiple type made integral with the armature-head flange on the end opposite the commutator. Air is taken into the frame at the commutator end through a screened opening and divides into two streams, one passing over and around the armature and field coils, while the other is drawn through longitudinal ducts in the armature core. All of the air is expelled from the frame at the end opposite the commutator. These motors are designed for operation at 1,500 volts per commutator with two motors connected permanently in series for the 3,000-volt supply. The gears are of the forged steel type with a reduction of 82 to 18 or 4.56.

NON-AUTOMATIC SINGLE-UNIT CONTROL INSTALLED

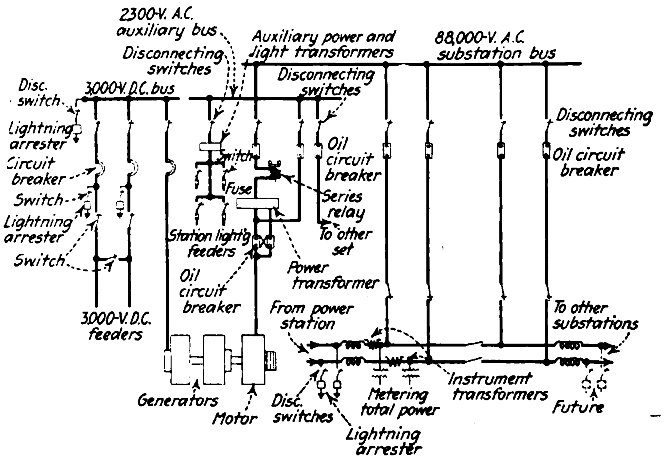
The control equipment is the type M, designed for non-automatic single-unit operation of the locomotives. All contactors, rheostats, transfer switches and the reverser are located in the central compartment of the cab. The master controllers, brake control, sander control, pantograph and other control devices are in the operator's cabs at the ends of the locomotive.

Energy for operation of the control is obtained from a 65-volt generator which is a part of the compressor exhauster unit. A 65-volt storage battery is connected in parallel with the generator to maintain constant voltage and to supply auxiliary lighting when the set is not running.

The motors may be operated all four in series through fourteen steps of resistance, and with two motors in series and two groups in parallel through ten steps of resistance. Regenerative braking is provided for returning energy to the line on descending grades. Ten steps are used for the regenerative braking control. The lighting and miscellaneous equipment includes the necessary lamps, switches, fuses and wiring for illuminating the cab and for headlights and accessories. The headlights are of the incandescent type with side number plates and are supplied from the 65-volt generator or battery. Speed recorders are included as a part of the locomotive equipment. The draft gear is attached to the end frames of the truck and is of the usual European type. The compressor-exhauster set is a combined unit having a compressor with a total piston displacement of 48 cu.ft. of air per minute at a pressure of 90 lb. per sq.in., an exhauster with a displacement of 150 cu.ft. of air per minute and a 65-volt direct-current generator above mentioned. The unit is driven by a 3,000-volt, direct-current motor, operating from the trolley.

PASSENGER LOCOMOTIVES HAVE GUIDING TRUCK AT EACH END

The passenger locomotives are similar in design to the freight units except that a two-axle guiding truck is provided at each end to comply with the railway company's specifications for high-speed service. The motors used are identical with those on the freight locomotive except for the change in gear ratio to provide for maximum speeds of from 56 to 62 m.p.h. The running gear consists of two two-axle driving trucks, the inner ends of which are connected by an articulated joint. The outer ends are extended and supported on the guiding trucks by roller centering devices over the front axle and an articulated joint over the rear axle which also connects the guiding and motor trucks. The general arrangement of motors and control is the same as that on the freight locomotives, and a similar system of regenerative braking is also provided. This locomotive is designed for hauling a train of 440 tons trailing up a 1 per cent grade at a speed of 38.8 m.p.h. The gear ratio on the passenger locomotive is 70:30 or 2.33.

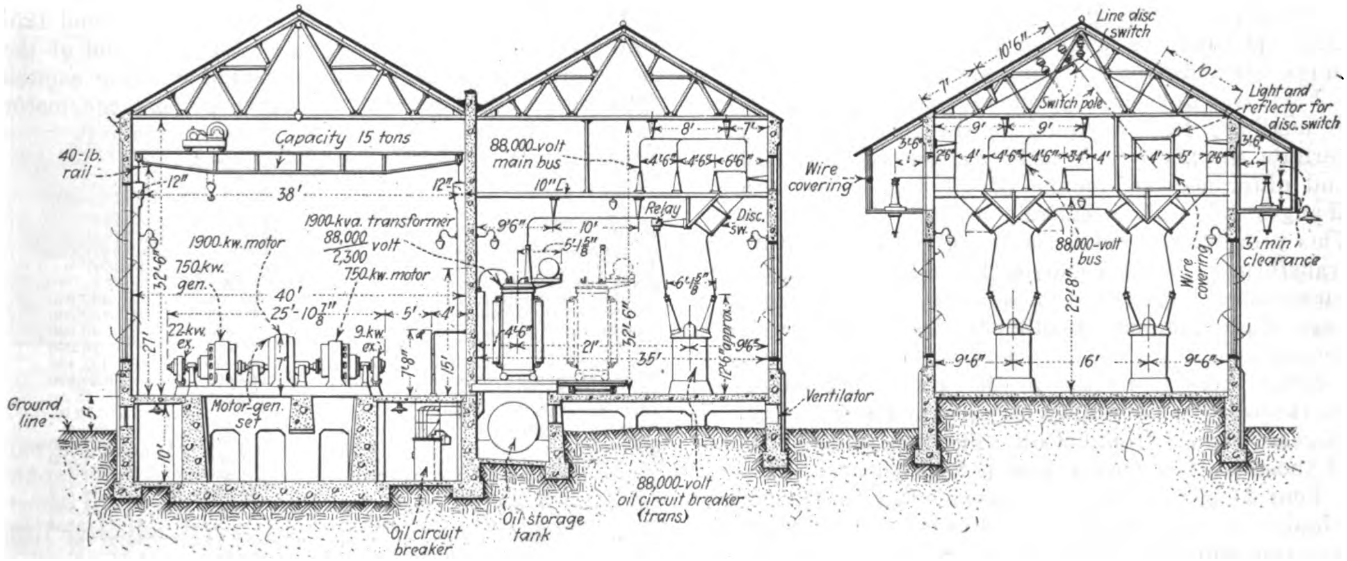

2300-V. A.C. auxiliary bus
Auxiliary power and light transformers
88,000-V. A.C. substation bus
Disconnecting switches
Disc. switch
3000-V. D.C. bus
Disconnecting switches
Lightning arrester
Circuit breaker
Switch
Lightning arrester
Switch
Switch
Fuse
Oil circuit breaker
Series relay
To other set
Disconnecting switches
Oil circuit breaker
Station light'g feeders
Oil circuit breaker
Power transformer
3,000-V. D.C. feeders
From power station
To other substations
Generators
Motor
Disc. switches
Metering total power
Instrument transformers
Future
Lightning arrester

SIMPLIFIED WIRING DIAGRAM, LOUVEIRA SUBSTATION

For speeds above the full series and full parallel connections a shunted field connection is provided by means of which the field current is reduced for maximum speed running.

Regenerative braking is accomplished by connecting one motor in such a way that it excites the field of three other motors and also its own field. This scheme is in general similar to that used on the Chicago, Milwaukee & St. Paul gearless passenger locomotives; it eliminates the necessity for a separate motor-generator set for excitation. A balancing resistance is connected in the circuit to protect the motors against sudden surges of the line voltage and to give effective protection against line voltage changes. In order to begin regeneration the main controller handle is turned to the first notch series position and the selective handle to the braking position. The main handle is then notched up until the desired braking effect is obtained.

A high-speed circuit breaker is placed between the 3,000-volt trolley and the locomotive apparatus. The duty of this breaker is to protect the motors and equipment from injury due to short circuits or overloads. In case of a short circuit this breaker cuts in a protective resistance and then opens the line contactor. The


Capacity 15 tons
40-lb. rail
12"
38'
12"
88,000-volt main bus
10" ⊏
1900-kva. transformer 88,000/2,300 volt
1900-kw. motor
750-kw. gen.
750-kw. motor
32'-6"
40'
25'-10 7/8"
5'
4'
27'
22-kw. ex.
9-kw. ex.
7'
7'-8"
15'
4'
Ground line
5'
Motor-gen. set
10'
Oil circuit breaker
Oil storage tank
88,000-volt oil circuit breaker (trans)
8'
7'
4'6"
4'6"
6'6"
Relay
Disc. sw.
9'6"
10'
5'-1 5/8"
6'-1 5/8"
4'6"
21'
32'-6"
35'
12'-6" approx.
9'6"
Ventilator
Wire covering
Line disc switch
10'6"
7'
10'
Switch pole
Light and reflector for disc. switch
9'
9'
3'6"
2'6"
4'
4'6"
4'6"
3'4"
4'
4'
5'
2'6"
3'6"
88,000-volt bus
22'-8"
Wire covering
3' min. clearance
9'-6"
16'
9'-6"

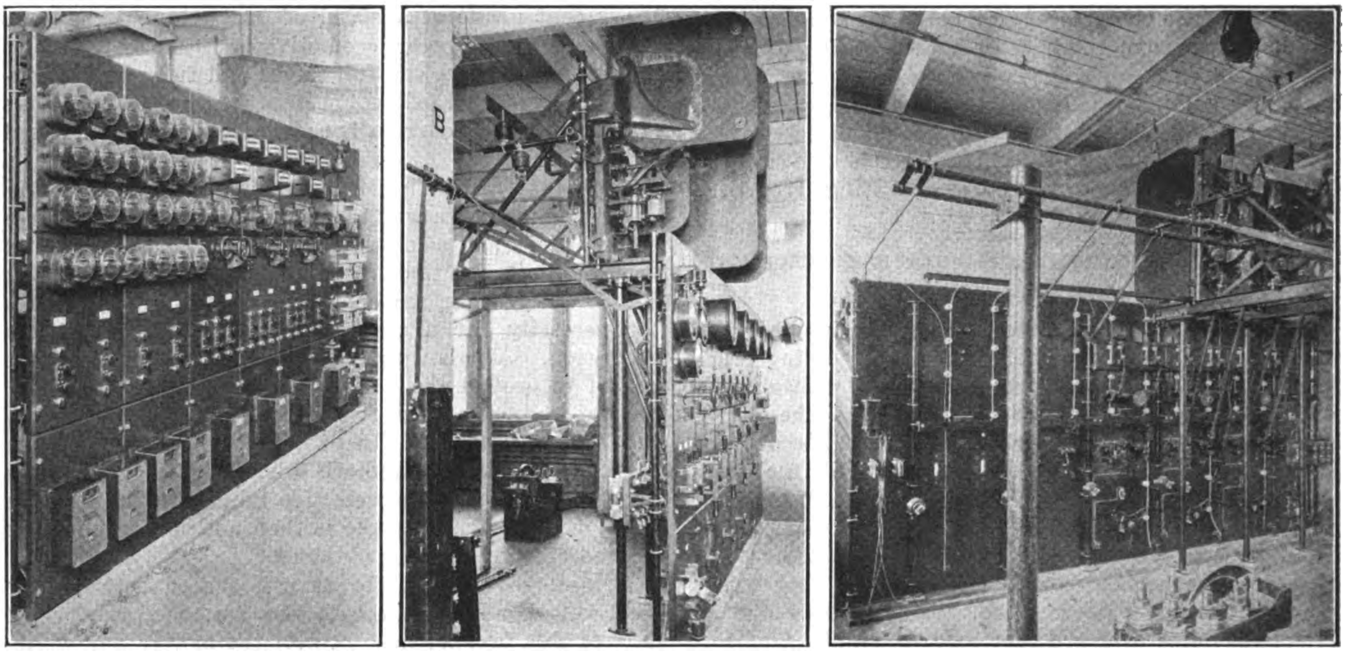
VERTICAL SECTIONS OF SUBSTATION (SEE A-A AND B-B IN PLAN) action is very rapid so that in case of heavy overload, or short circuit, the possibility of damage is reduced to a minimum. Breakers of a similar type are in operation in many parts of the United States both on locomotives and in substations.

Table III gives the dimensions, capacity and weights of the two locomotives.

SUBSTATION INSTALLED AT LOUVEIRA

For the initial electric zone between Jundiahy and Campinas one substation is being installed located at Louveira, a distance of 9.5 miles from Jundiahy. This station contains three 1,500-kw., three-unit synchronous motor-generator sets, each arranged to operate its two generators in series for 3,000 volts. Power is received from an 88,000-volt, 60-cycle transmission line and stepped down through three three-phase, 1,900-kva. transformers to 2,300 volts for the synchronous motor.

The three-phase oil-insulated and oil-cooled transformers are rated at 1,900 kw. and are inclosed in tanks of steel plate with all joints welded. Four separable steel radiators are mounted on the outside of the tank to provide sufficient radiating surface.



SWITCHBOARD VIEWS, LOUVEIRA SUBSTATION

At left, 90-in. feeder and synchronous motor switchboard. In center, 3,000-generator and railway feeder switchboard. At right, back of the generator and feeder board shown from another angle in the center illustration.

Each transformer is provided with an oil conservator or auxiliary tank mounted on the cover. This device permits the main tank to be completely filled with oil and differences in volume of oil due to temperature changes take place entirely within the conservator. This prevents the condensation of moisture within the transformer. Such condensation as may occur in the conservator is collected in a sump, is indicated on a gage glass and may readily be drawn off through a pet-cock.

Since there is no air in the main tank above the oil there is no possibility of explosion due to ignition of gases formed from hot oil. The guaranteed efficiency of these units at normal load is 98.3 per cent.

Four 2½ per cent taps are provided in the low-voltage winding to compensate for variation in the transmission line voltage and 50 per cent starting taps are also provided for starting the motor-generator sets.

The motor-generator sets are substantially similar to those furnished for heavy electric railroad work in the United States. The generators are designed for 1,500 volts per commutator and are permanently connected in series for 3,000-volt operation. They are separately excited from a 125-volt, direct-current exciter mounted at one end of the set. The series field is designed to provide flat compounding from no load to 150 per cent load. They are equipped with commutating poles and compensated pole-face windings to insure sparkless commutation at all loads. A load of three times normal rating can be carried for five minutes without injury, and under tests made before shipment loads of from five to six times normal were carried without sparking.

All of the fields of both generators are connected to the "low" side to reduce the possibility of injury from high voltage. A simple form of flash barrier is provided for the commutators similar to that supplied on other high-voltage, direct-current machines.

The synchronous motor is excited from a second 125-volt exciter direct-connected to the opposite end of the set. This exciter carries a compound winding excited from the main 3,000-volt conductor so that the motor

TABLE III—DATA ON GENERAL ELECTRIC LOCOMOTIVES FOR PAULISTA RAILWAY

	Freight	Passenger
Length over all	39 ft. 2 in.	55 ft.
Width	10 ft. 1¼ in.	10 ft. 1¼ in.
Height over trolley down	14 ft. 3 in.	14 ft. 3 in.
Total wheelbase	26 ft. 8 in.	46 ft. 0
Rigid wheelbase	8 ft. 8 in.	7 ft. 9 in.
Total weight, pounds	200,000	240,000
Weight on drivers, pounds	200,000	160,000
Weight per driving axle, pounds	50,000	40,000
Weight per guiding axle, pounds	None	20,000
Weight of mechanical equipment, pounds	115,400	155,400
Weight of electrical equipment, pounds	84,600	84,600
Diameter of drivers	42 in.	42 in.
Diameter of guiding wheel	.....	36 in.
Number of motors	4	4
Gear ratio	82:18	70:30
Total continuous rating, horsepower	1,600	1,600
Total (one-hour rating) horsepower	1,680	1,680
Tractive effort, continuous, pounds	28,820	14,720
Tractive effort, one hour, pounds	30,600	15,680
Speed, continuous rating, miles per hour	21 (34. km.)	41.25 (66.4 km.
Speed, one-hour rating, miles per hour	20.8 (33.5 km.)	40.5 (65 km.)
Maximum safe speed, miles per hour	28	53
Tractive effort, 30 per cent adhesion, pounds	60,000	48,000

field excitation varies in proportion to the load on the set. This provides for the proper excitation to give correct power factor with varying loads and also insures stable operation under heavy overloads. The equipment is designed for inverted operation to take care of reverse power in cases of regeneration.

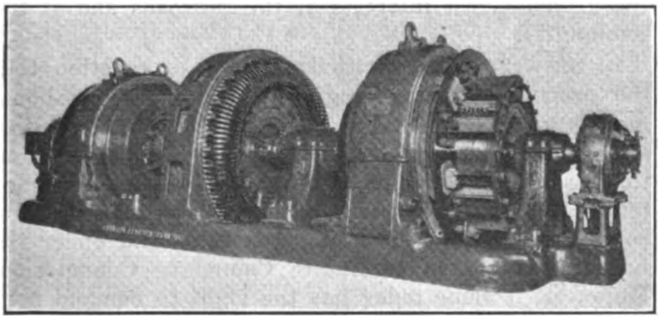
The switchboard is similar in design to other 3,000-volt, direct-current equipment. The 3,000-volt panels are installed together with the auxiliary station lighting panel. The high-voltage panels include one for each of the motor-generator sets and one for each outgoing feeder. The main circuit breakers are located above and to the rear of the switchboard panels so as to be well out of reach to prevent accidental contact. They are remote-controlled from operating levers located on the front of the panels. A 3,000-volt line switch is also included with each circuit breaker. These switches are remote-controlled from the front of the panel, as a safety measure. The switch handles for the circuit breakers are inverted to distinguish them from the line switches. The alternating-current switchboard is electrically controlled throughout. For lightning protection, a 96,000-volt aluminum-cell arrester is installed in the high-tension room of the station.

As a protection from short circuits and excessive overloads a high-speed circuit breaker is furnished with each motor-generator set. This is connected to the negative terminal of the machine and arranged to connect a limiting resistance into the circuit upon opening. At the same time the station circuit breakers are opened, completely cutting off the power supply. The speed of these circuit breakers is such that resistance is inserted in the circuit before the short circuit current reaches sufficient value to injure the apparatus.

Other auxiliary equipment supplied to the station includes a 15-ton hand-operated crane, a portable oil filter press and oil testing equipment, and a stationary compressor set. For control current a 4¾-kw. battery-charging motor-generator set is used with a 170-volt storage battery.

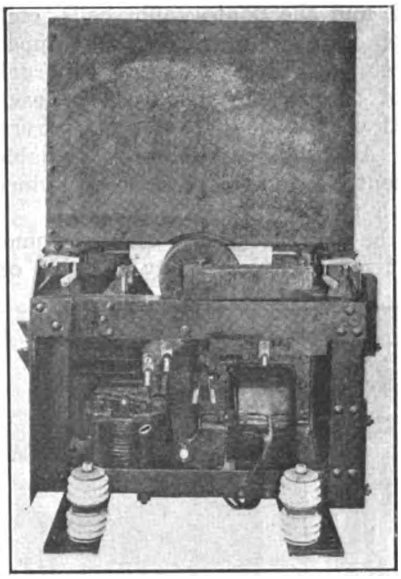
HIGH-TENSION CONNECTION WITH POWER COMPANY'S LINE

The railway company's high-tension transmission line has been constructed with duplicate circuits mounted on separate wood poles between Jundiahy and Louveira, a total distance of 10 miles. At Jundiahy this line is permanently tied in with a new line constructed by the São Paulo Light & Power Company, extending a distance of about 16.8 miles to the hydro-electric station at Parnahyba. The power company's line is constructed with an H-type pole line carrying the duplicate circuits. This transmission line from the waterpower plant to the substation will thus be operated over a distance of 26.7 miles as a single system at 88,000 volts, three-phase, 60 cycles. The line is designed ultimately to supply three substations and the conductors are of No. 0 B. & S. stranded copper which will insure a very low line loss under ordinary operating conditions. On the railway company's lines two crossarms are used, with large pin-type insulators. A ground wire is also carried on each transmission line for lightning protection.



THREE-UNIT, FOUR-BEARING, 1,500-KW. M. G. SET IN LOUVEIRA SUBSTATION

The overhead line construction is of the same general design as that used on the Chicago, Milwaukee & St. Paul. This is known as the twin-catenary construction, with two No. 0000 contact wires supported from the same steel messenger by loop hangers. Wood poles suitably guyed support the catenary. Hangers for the two contact wires are attached at alternate points to give a flexible construction and to insure the elimination of all "hard spots." Bracket supports are used on single-track and cross spans on multiple-track construction. The normal height of the contact wire is 21 ft. above the rail. For all sidings and yard tracks a single wire is used over each track. The General Electric Company furnished hangers, pull-offs, copper and steel wire, miscellaneous hardware, etc., for 76 miles of track.



HIGH-SPEED SUBSTATION CIRCUIT BREAKER

The twin-catenary construction is particularly successful on lines operating heavy trains requiring the collection of large amounts of current through pantograph trolleys. In addition to the advantage of the two contact wires for handling the current required, this construction also insures practically sparkless collection at the point of contact, both for heavy freight and high speed passenger operation.

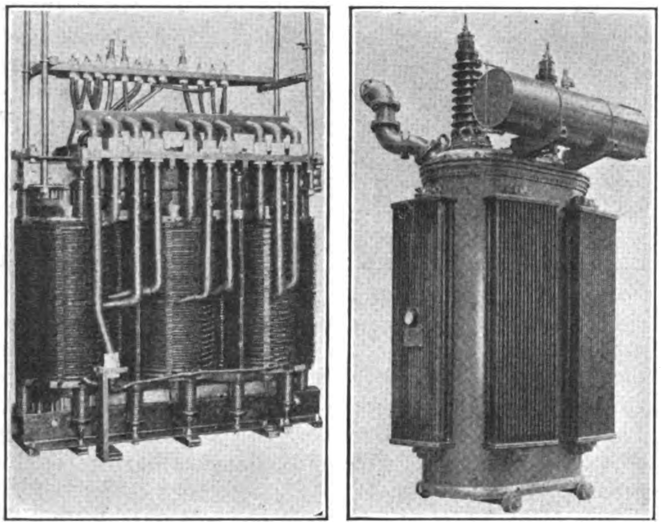
The rails on this line weigh 91 lb. per yard. They are bonded with pin-terminal-type bonds, 42 in. in length and of 211,600 circ.mil cross section. Cross bonds are also used for interconnecting the rails of the same track and for bonding between tracks on the multiple-track section.

TESTING AND SHIPPING THE LOCOMOTIVES

In the preparation of the locomotives for testing and for export shipment there were a number of unusual features. As the gage of track on the Paulista Railway is 5 ft. 3 in., special arrangements were necessary to provide for removing the locomotives from the shop to the test track and other arrangements were necessary to provide the necessary test track. For this purpose about 1 mile of extra rail was laid on the East Erie Commercial Railroad with 5 ft. 3 in. gage. In order to transport the locomotives from the shops to the test track, a distance of about ¾ mile, special transfer trucks were used, one for each truck of the locomotive. By means of these trucks, which operate on their own wheels of standard gage, the locomotives were moved out over the usual transfer table and standard-gage track to the special-gage section provided for testing. Upon reaching this section they were moved off the transfer trucks over a ramp, the end of which was elevated to the same height as the special trucks.

A complete set of tests is made on all locomotives, including regenerative braking and high-speed running. After test the locomotives are transferred to the shipping department, where they are dismantled and prepared for export shipment. The cab complete is removed from the truck and the pantograph, bells, etc., removed from the cab roof. Each truck is shipped separately without removing the motors from the truck frame. In the case of the passenger locomotive, each bogie truck is shipped with the adjacent motor truck without dismantling. As large vessels were available for making this shipment it was not necessary to reduce the locomotive to small packages.

As to progress on the construction of these locomotives, the first freight machine was ready for test on March 15. During May three freight and one passenger locomotives were shipped and progress on the balance of the order indicated that similar shipments will be made the following two months in accordance with the terms of the contract.



AT LEFT, THREE-PHASE TRANSFORMER FOR LOUVEIRA SUBSTATION, HIGH-TENSION SIDE

At right, case for a single-phase transformer, showing type to be used at Louveira. (Exterior view of actual case not available at this time.)

Responsibility for Accident Fixed

THE Interstate Commerce Commission in fixing the responsibility for head-on collision between a passenger train and an extra freight train of the Northern Ohio Traction & Light Company near Ravenna, Ohio, on Dec. 8, 1920, resulting in the death of four people and injury to seventeen, finds the conductor and motorman of the extra train to blame. The conductor of the extra train, which was being operated ahead of the regular train, proceeded from a siding at the sound of a whistle from the regular train intended as a signal to move ahead so there would be room for it to clear the switch. The extra train proceeded on this signal, the conductor assuming that the following train had orders to meet the opposing train at the next station.

Recommends Electrification Commission

Frank J. Sprague Points Out the Advantages of Such a Body at the Meeting of the Chicago Traffic Club on June 2—He Includes Representation of the Interstate Commerce Commission in Its Personnel

ACCORDING to Frank J. Sprague the time is ripe for the formation of a national engineering commission to consider electrification problems, the commission to be selected by the American Railway Association and to include representatives of the Interstate Commerce Commission, the National Electric Light Association and the water power, telephone and telegraph interests, in full touch with manufacturing developments. This suggestion was made by Mr. Sprague in the course of an address by him before the Traffic Club of Chicago on June 2, in which he considered also the development of the electric railway.

In Mr. Sprague's opinion the demand for electrification will come not because of superior fuel economy or savings in operating expenses possessed by the electric locomotive but because of the need for increasing the capacity of the railway by "that increase of speed which can only be obtained when unlimited power is at the command of operative officials and a type of equipment is used which will permit radical changes in methods of train handling, both on the road and at terminals." Mr. Sprague recognizes that electrification must come progressively, but he believes that the financial problems concerned with main-line electrification would be ameliorated if the railroads recognized that their primary province is the transportation and distribution of passengers and freight and that their power requirements should be supplied from central generating stations.

He then points out that the railway power demands in the city of Chicago, for instance, could be met by the Commonwealth Company by the addition of only a fraction of its present capacity and that this could be added in less time than the railroads could possibly be electrically equipped. He also expressed the belief that electrification in Chicago should be determined not according to the needs of a single railroad, but by that of all the railroads centering in the district, in co-operation with the local authorities, keeping in view the ultimate best interests of the railroads and of the community.

In answer to any criticism of his suggestion that the proposed national engineering association should include in its membership representatives of the Interstate Commerce Commission, Mr. Sprague called attention to the fact that the equipment and operation of trunk-line railways, in fact of all railways crossing state bounds, is a matter of national concern and under the jurisdiction of the Interstate Commerce Commission. Moreover, it alone today has the right to demand intimate comparative statistics and data covering the equipment and operation of railroads by different systems and its power and authority are likely to be augmented rather than restricted. Finally, in the consideration of another railway problem, that of automatic or auxiliary train control, the power to order the installation of such a system was placed in the hands of the commission in the recently enacted general railway bill.

N.E.L.A. Meeting Well Attended

At Its Annual Convention, Held at Chicago May 31 to June 3, National Electric Light Association Considered Railroad Electrification, Power Generation and Distribution, and Other Technical Subjects, but Laid Special Stress on Public Relations, Finance and Operation in Their Broad Aspects

THE convention of the National Electric Light Association, held in Chicago last week, occupied itself largely with finance and public relations. Executives, engineers, bankers and heads of the manufacturing and jobbing concerns were in attendance. The questions of regulation were discussed from all angles by managers of utilities and by public service commissioners. Public relations, to the betterment of which the association has devoted so much time and publicity during the past few months, received earnest consideration. From without the industry, manufacturers, bankers, publicists and government officials contributed their impressions of how utilities may best win public recognition and support, while from within the testimony of executives and others showed that the electric public utilities of the country are doing their part through excellent service at fair rates and through various channels of public information to carry the message of the utilities to the man in the street.

Samuel Insull, speaking on future expansion in the use of central-station power, touched on some of the vital issues of the day and gave wholesome advice on superpower systems. It is fair to say that no session of the very many held during the week was without its important feature. In fact, the program was so crammed with excellent reports, papers and addresses that their immediate absorption and appreciation was out of the question during the sessions of the convention.

A masterful analysis of the fundamental economics affecting electric light and power company service, in which the attention of the industry was focused on the points of primary interest, was made by Martin J. Insull in his presidential address. Mr. Insull stated that the industry is in a strong position but in need of tremendous sums of money to take care of the program of expansion demanded by the public. Money, he believed, must be obtained from the public, which fact necessitates careful attention to good public relations. Finally, he saw the cessation of municipal regulation and operation in favor of state regulation. The small-town plant is going; the big system feeding the small towns from a transmission line is taking its place.

In general, said Mr. Insull, the electric light and power business continues its growth. It is estimated that there is necessary and will be installed 1,000,000 kw. of generating capacity during this calendar year. The industry may, therefore, look forward to a promising future. It is estimated that for the next five years the electric light and power industry, in order to provide for the demands that will be made upon it by the public, will require approximately $1,000,000,000 per year.

At the second general and executive session, in reporting for the Superpower Survey, M. S. Sloan said that the government had appropriated $100,000 for the study and that a number of utilities and manufacturing companies had contributed $50,000 more to complete the work. The chief difficulties were legal and financial rather than engineering. It was the purpose, he said, to seek a federal charter because of limitations imposed by state laws and the charters of the large public utilities involved. The committee was unanimous in its opinion that the superpower system should be controlled by the existing public utilities and financed by private capital.

R. H. Ballard of Los Angeles, in reporting for the public policy sub-committee on inductive interference, told of the meetings held between executives of the National Electric Light Association and the American Telephone & Telegraph Company for the purpose of correlating their activities and jointly working out solutions to inductive-interference problems. While the engineers will continue their work, it was agreed that no precedents would be invoked in establishing the rights of either the telephone or electric light companies, but that both interests would seek the best economic solution of the problem.

The report of the underground systems committee was of special importance because of manufacturers in the country now being able to construct cables capable of withstanding voltages up to 33,000. Discussing higher voltages for underground cables, Mr. Roper said that the Commonwealth Edison Company is planning to distribute 33,000 volts over cables which during the last two years have been installed for 22,000 volts. No trouble is expected with the higher voltage. The report of the committee on prime movers was a complete one. It will be abstracted in a later issue of this paper. That of the committee on railroad electrification is abstracted below.

Electrification of Steam Railroads

THE committee on steam railroad electrification presented a general study of the subject with a view to showing the members of the association how and why the railroads will furnish an increasing market for electric power. The committee comprised L. A. Ferguson, vice-president Commonwealth Edison Company, Chicago, Ill., chairman; A. H. Armstrong, General Electric Company; W. C. L. Eglin, Philadelphia Electric Company, and F. H. Shepard, Westinghouse Electric & Manufacturing Company. The following abstracts from the report will indicate its general form and spirit:

The steam locomotive has been developed to a point where it meets the conditions imposed upon it by the transportation problems of freight and passenger services, satisfactorily in most cases and in all cases where the traffic is light. As the traffic has increased on roads on which there are heavy grades, additional capacity has had to be provided by laying additional tracks. It is not the intention of the committee at this time to advocate the abandonment of either the freight or the passenger steam locomotive in places where it can be used to economical advantage.

The steam locomotive suffers from the disadvantage that the steam generator must be carried with it, and it must be capable of withstanding shocks and vibrations, thus limiting the design of the fire-box to a metal fire-box of relatively small size and materially reducing the efficient burning of the coal. The standby losses of the locomotive must be high and these losses increase in the larger units, as the coal must be consumed whether the engine is running or not, as long as the locomotive is in service.

REAL ESTATE CONSIDERATIONS IN ELECTRIFICATION

The economical advantages of moving freight in bulk, requiring the use of heavy trains, are causing increase in the size of the yards and the terminal facilities so as properly to assemble these trains. With the growing value of real estate in the large communities, the cost of these terminals now forms an important part of the total railroad investment, and with the development of the city with buildings surrounding the existing yards it is becoming very difficult to enlarge these facilities to meet the growing requirements. Thus means must be provided to increase the capacity of yards and terminals. It seems logical and rational that both the railroad tracks and especially the yards and terminals must be operated at a number of levels to increase their capacity in the existing areas. This must be accomplished by the elimination of the steam boiler from the locomotive.

For two essential reasons—the ability must be had to increase the locomotive capacity to any desired limit for haulage purposes on the existing main tracks and it must be possible to permit the tracks to be placed on various levels—some method of delivering power to the locomotive other than in the form of coal in the present locomotive tender must be employed.

WHERE THE ELECTRIC LOCOMOTIVE FITS IN

The application of electricity to the railroads will naturally follow the line of its application to the industries. It will permit a better accomplishment of the functions of the railroad by increasing the speed of trains and reduction in the investment cost of terminals or the increase in their capacity. Its application must come where the greatest advantages of its use will be shown. Probably the most notable examples will be in the operation of trains through long tunnels, where the ventilation problem makes it more mandatory; in meeting the increasing requirements of terminal and yard facilities; in maintaining the highest speeds on the roads with heavy grades, and in its use on sections in which increased speed of general or special movements is necessary to handle existing or growing passenger or freight traffic.

The committee believes that the extension of the use of electricity for motive power must come through its economic advantages and its ability to assist the railroad organization in meeting the growing requirements of traffic and reducing the cost of operation and maintenance.

VARIETY IN TYPE OF MOTIVE POWER WILL CONTINUE

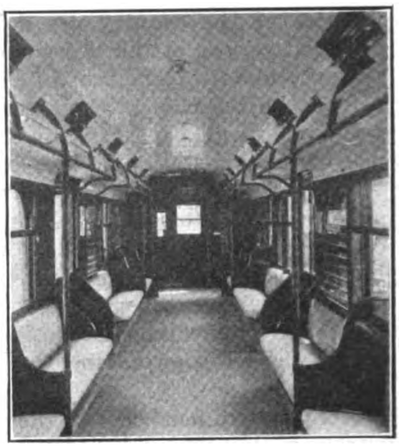
There are now available methods and apparatus such that electrical energy may be supplied to the train to meet the requirements of speed, load and grade. The selection of the type of apparatus will vary with the requirements of the railroads, and it is probable that there will be as many different sizes, types and designs of electric locomotives as there are at present of steam locomotives.

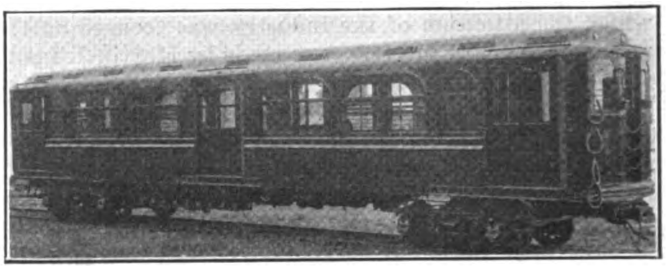
The power companies of the United States should be ready to furnish electrical energy to take the place of the coal which is now delivered to the railroads at the mines, enabling the railroads to obtain promptly and in any quantity the required electrical energy produced by the large generating stations of the power companies, and that at a rate which would compare favorably with the cost of its production in power houses built for the railroad load alone.

New Tube Cars

Hudson & Manhattan Railroad Lengthens Doors on Latest Twenty-five Cars and Makes a Few Changes in Interior Equipment of Car

THE Hudson & Manhattan Railroad has recently purchased twenty-five additional steel cars to accommodate the traffic of the road. The construction of these cars follows very closely that of the cars previously used by the company, but they have wider side doors and are 3 ft. longer over all than the older cars. The use of the wider center doors does not change the seating capacity, but adds greatly to the convenience of passengers in entering and leaving the cars. Another point of difference is that while the system of vertical posts and horizontal rods for passenger support in the car is retained the posts directly on each side of the side doors have been omitted. This change is shown in the view of the car interior. The purpose of this change is to prevent passengers from blocking the side entrance by holding on to one of these posts.





THESE NEW HUDSON & MANHATTAN CARS EMBODY SEVERAL CHANGES FROM THE FORMER TYPE

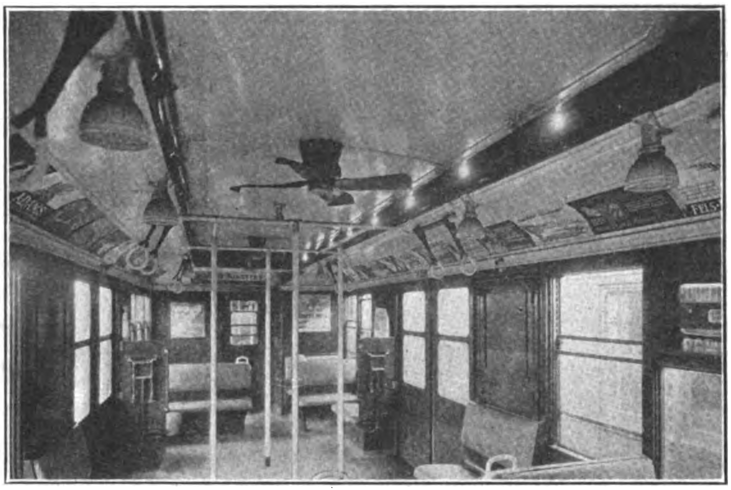
The new cars are equipped with ceiling fans. Similar fans are also to be applied in the older cars to provide for a brisk circulation of air even when the cars are standing at stations. The fans do not show in the interior view of the car as they had not yet been installed when the picture was taken.

The cars are equipped with GE-259-A motors, G. E. P. C. control and Westinghouse A. M. L. E. air brake equipments, all adapted to function with the older equipment, which has been fully described in the ELECTRIC RAILWAY JOURNAL.

New York Municipal Car Improvements

Since the Introduction of the Large Multi-Side-Door Cars on the Lines of the New York Municipal Railway Various Additions and Refinements Have Been Made to Provide Increased Comfort and Safety for Passengers

WHEN the Brooklyn Rapid Transit System offered to operate a part of the vast subway and elevated network as suggested by the city of New York in 1911 the design of a car most desirable was one of the vast problems presented to the engineers of this company for solution. When the various details of design were finally settled the most noteworthy characteristics of this car in which it differed from other designs were its large size, its unique seating arrangement and its multi-side-door construction. The value of these new features embodied in the design has now been demonstrated by more than five years of service under the most severe traffic conditions that can be found in any city. At present 900 of these cars are in service or on order and in the fundamental considerations the last cars, namely, the 2,800 series, are identical with the first ordered. Quite a number of refinements and improvements have been added, but the changes which were made in construction were very few.


LOW MONITOR TYPE ROOF CONSTRUCTION WITH DECK-SASH VENTILATORS, VENTILATING FANS AND REARRANGED LIGHTING

The essential characteristics of the design, construction and equipment of these cars were very completely covered in a series of articles published in the issues of the ELECTRIC RAILWAY JOURNAL for June 6, 1914; June 13, 1914; Dec. 26, 1914; March 13, 1915; March 27, 1915, and May 8, 1915. The purpose of the present article is to describe some of the improvements and changes incorporated in the last 100 cars ordered and include additions made since this series of articles was published.

MONITOR TYPE ROOF FOR VENTILATION

The form of roof used with the 2,800s is of a low monitor type with twenty deck-sash ventilators on each side of the car. This construction provides a clearstory 4 ft. 11 in. wide inside by 12¾ in. deep. The deck-sash ventilators are arranged in four groups, so that those in a quarter of the car can be operated separately from a lever near the center of the car. The ventilators swing horizontally and have an opening of 25 in. by 4½ in. This type of roof construction lends itself particularly well to the ventilation system using five ceiling fans in each car.

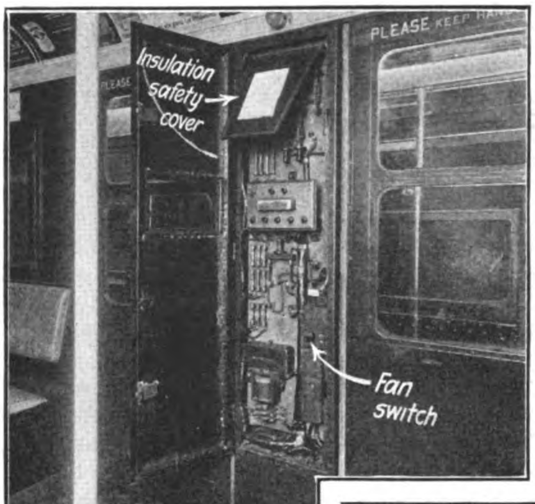
The five ceiling fans are arranged with one opposite the center pair of doors and the others at about equal distances along the center of the headlining. The five fans of each car are connected in series across the line, so that each fan is wound for 115 volts. The fan motor frame is designed for direct attachment to the car ceiling and a metal canopy incloses the top part of the motor.

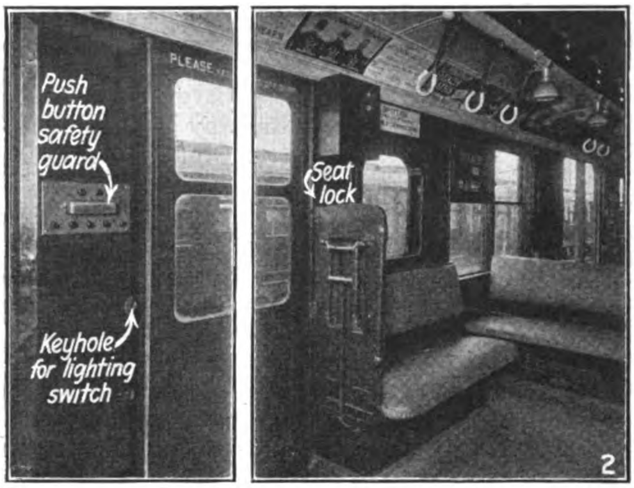
With the use of the ceiling fans the arrangement of lights consists of fourteen side lights, seven on either side, installed just at the edge of the clearstory, and six center lights, two of which are end lights. There is thus a total of twenty 56-watt lamps with shades per car. The fundamental principle of the seating arrangement adopted for the New York Municipal cars was to obtain maximum seating capacity during hours of normal traffic and maximum standing room plus a reasonable proportion of seating capacity during the rush hours. In order to facilitate movement to and from the door openings the space opposite each active doorway was kept free, except for vertical stanchions installed for the accommodation of standing passengers. Study of the conditions that existed with the cars loaded to their maximum capacity indicated that a few hand straps on either side of the door openings provide comfort for the standing passengers, and accordingly twenty-eight hand straps, fourteen on either side of the car, have been installed. These are grouped with two hand straps on either side of the end side doors and three hand straps on either side of the center pair of side doors. These are of the Henry type, all metal with white enameled hand grips, and arranged to be held back close to the side of the car by spring pressure when not in use.

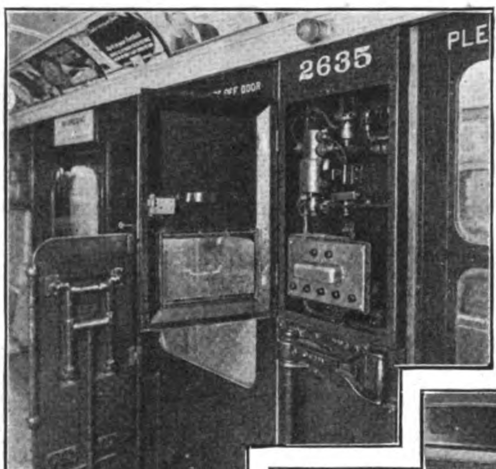
IMPROVEMENT IN FOLDING SEATS

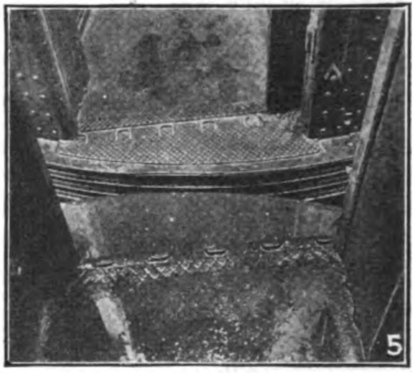
In order to increase the seating capacity during hours of normal traffic, hinged folding seats are used on either side of the door openings. In their raised position these folding seats serve as ends for the longitudinal seats and a grab handle along the front edge enables standing passengers to get a firm hold. These folding seats are held in their raised position by a lock catch which can be released only by the aid of the key used for the end doors and the operator's push-button box. With the seats in their "down" position a prop swings out from the under side and rests on the floor. This seat prop is made of a pipe framework with two legs which have rubber cushions at the points where they

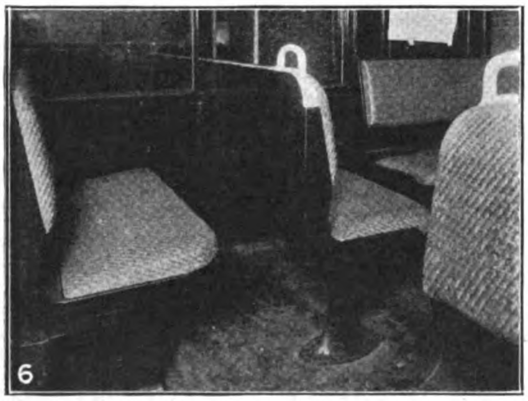
Some Features Embodied in New York Municipal Railway Company's Cars


Insulation safety cover
Fan switch
1

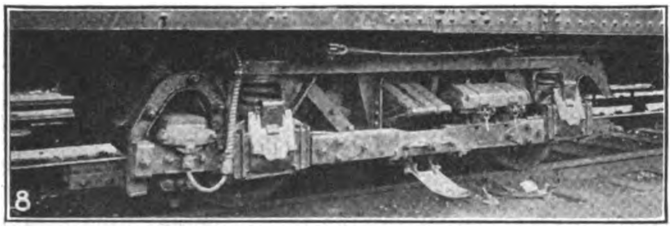

Push button safety guard
Keyhole for lighting switch
Seat lock
2

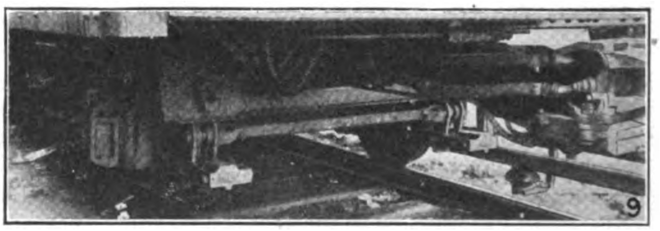






POST TOASTIES
WARD'S BREAD
7





1—Interior of switchboard panel.
2—Push-button section of switchboard panel, pipe framework footrest interlocked with door engine, cut out, coasting recorders, destination sign and hand straps.
3—Wide type pantograph shoes.
4—Small panel box with push-button switch, recess provided for hand brake.
5—Types of end-door threshold plates.
6—Cross-seat recessed to provide knee room for passengers in seat behind.
7—Paneling at end of car, design of motorman's cab door and end door with drop sash.
8—Truck mechanism, cast steel contact shoes and shoe-fuse box cover.
9—Safety hangers for truck slack adjusters and shoe hangers cross connected.

rest on the floor. All parts are rounded so that no sharp corners or projections are presented, which might prove injurious to passengers or their clothing, and as this framework is mounted so that it extends out from the side of the seat it also serves as a grab handle for standing passengers, with ample space for their fingers to provide against accident. A center leg of this framework is attached to a lever which is connected to the door engine underneath the stationary seat at this point. The lowering of the folding seat cuts off the air from the door engine, so as to insure that the door behind the seat cannot be operated with the seat in its down position.

It is the practice of the New York Municipal Railway to operate trains with the end doors of the several cars closed, and the seating arrangement provides a small seat just to the left of each end door with hinges, so that it can be raised but cannot be removed.

Two cross seats are located just to the rear of the motorman's cab. This is the only position in the car where two cross seats come one behind the other. To provide additional leg room for passengers in the rear seat, the back part of the front seat has been constructed with a cut-out portion, which comes just below the back seat cushion. By this ingenious arrangement, an additional 3 in. of leg room is provided for passengers without change in the other parts of the seat construction.

NO DANGER OF INTERFERENCE WITH MOTORMAN

To provide maximum privacy for the motorman the door of the cab has been provided with a steel panel in the top portion and a small length of wire-ribbed glass in the center portion. The bottom of the door is also provided with a dust guard, as it is found that with the car in motion a current of air from the end door blows in through the motorman's cab, particularly when the window is raised. Thus dust and other particles are blown under the bottom of the door. The steel panel in the rear of the motorman's cab is utilized for an advertising sign rack.

Several window positions have steel panels. One of these is just to the left of the end door and others are provided just to the side of the end side doors. The use of steel panels reduces the maintenance cost for broken glass considerably and also provides increased revenue from their availability as advertising sign racks.

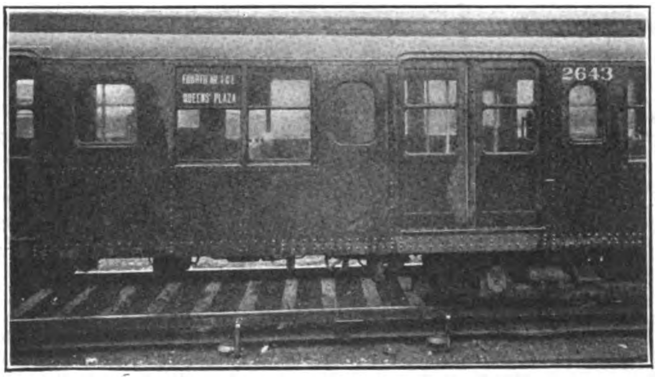
Drop sash have been provided in the end doors which are arranged for the dropping of the top part of the sash, the window being made in two parts. This gives increased ventilation and a circulation of air through the entire train.

In one of the accompanying illustrations showing exteriors of the cars the paneling of the small window to the left of the end-side doors can be seen. In these cars the car number has been placed on the side of the car over this window. It was found that this is preferable to numbered glass which when broken causes considerable delay in returning the car to service, as a new glass has to be numbered and the paint thoroughly dried before it can be installed. The routing and destination sign is located in the second window to the right of the center side doors. This location provides for use of signs with large letters which can be distinctly and easily read, and also gives more space for the sign proper, as the number of destinations and routes are increasing considerably due to the addition and operation of new lines.

In the illustration of the outside end of the car the pantograph safety gates are shown. A wide shoe now used insures proper contact even on sharp curves. Another view, taken between two cars, shows the threshold plates at the end doors. In the new design the outside ends have been cut off so that they extend but a few inches outside of the end doors.

ELECTRIC TRIP SWITCHES ADDED

In the views showing truck construction and equipment electric trip switches are shown at the left end of the truck. Two of these are installed per car on diagonally opposite corners. This truck mechanism for the trip switches consists of a lever which extends down toward the rail and engages the track trip. This lever is self-centering by heavy springs and acts through a gear and pinion to operate a contact device and open the circuit whenever it is operated. The opening of this circuit de-energizes the holding coil of an electro-pneumatic valve installed in the small cabinet over the push-button switches on the inside of the car.



DESTINATION SIGN WITH LARGE LETTERS, AND NUMBER ON SIDE OF CAR

This electro-pneumatic valve operates a dead man's valve which opens the brake pipe and causes an emergency application of the brakes. As soon as the track trip has been passed, the truck trip switch returns automatically to its central position, closing the circuit at that point. However, the circuit still remains open, due to the dropping of the electro-pneumatic valve. A reset circuit is used for restoring the valve to its normal position, with a reset switch in each motorman's cab. There is also a pneumatic switch in this circuit, which is connected directly to the brake pipe. This closes whenever the brake pipe pressure has been reduced to 5 lb. or less. The electro-pnuematic valve can then be reset without the motorman moving from his cab, but as the brake pipe pressure must be reduced to 5 lb. before this circuit is closed ample time is given to insure that the train comes to a stop before the normal condition can again be re-established.

The cast-steel contact shoe is also shown in the second illustration, and the shoe-fuse-box cover. The cover is of wood, reinforced with wide steel bands having spring mounting.

The journal boxes provide substantial support for the shoe beams and heavy brake-shoe release springs assure prompt release from the wheels. Following the general practice in this design of providing safety straps for all brake-rigging parts, additional safety straps have been added under the truck slack adjusters. A cross-connection has also been added between the brake-shoe hangers at the end of the truck. This gives a rigid construction and prevents brake shoes from developing false flanges or wearing out of true.

All doors of a car are controlled from push-button boxes forming a part of switchboard panels located on either side of the car between the center pair of doors. The push buttons are arranged in three rows, those in the center row being for opening the doors. To energize any of the push buttons it is necessary for the operator to insert a key in the key switch at the upper left-hand corner of the box and to turn this to close the circuit to the button. As an extra safeguard on the opening buttons, a cast-bronze guard is installed over them. With this in place there is no danger of false operations with the cars in motion should the operator forget to remove his key from the key switch.

The lighting, heater and compressor switches are located at the top of the panel board. An ingenious method of preventing the operator from hanging on to the steel door of the panel board or other grounded metallic parts while he is throwing these switches involves the use of an insulated safety cover. This cover is hinged from a point just above the top of the switches, and in its normal position extends down so as to cover the switches and the fuses completely. In order to throw a switch it is necessary for the operator to raise this insulated panel, and the most natural method of doing this is to hold it in its raised position with the left hand while the switches are being thrown with the right hand. The operator must maintain his hold on this insulating panel, which insures his being insulated from ground without danger of receiving a shock should he inadvertently touch any live part. This insulated panel also forms a very conspicuous place for posting information regarding the various fuses and switches. All fuses and switches are given numbers on the panel board and the instructions tell what circuits they are used in, so that should trouble occur in service the operator does not need to test several circuits to find the trouble, but can locate it immediately by referring to the instructions.

CONVENIENT METHOD OF OPERATING LIGHT SWITCH

Another ingenious and trouble-saving device is the key-lighting switch, located at the right-hand center part of the panel. As these cars operate in the open as well as in tunnels, it is necessary to turn the lights on and off during each trip. With the usual type of lighting switch this would require the opening of the panel board door each time it was necessary to throw this switch. This requirement has been done away with by the use of a key switch in the lighting circuit which can be operated by the insertion and turning of a key without opening the panel board door. The keyhole for this switch is made with a large funnel-shaped guard, so that the operator can readily find the keyhole even should he neglect to turn the light on in the car until after it enters the tunnel.

This panel board also contains the switch for operating the ventilating fans. This is a safety switch located just underneath the safety lighting switch. All exposed parts of this switch are insulated, so that the operator cannot come in contact with any live parts.

The hand-brake handle folds back against the side of the car just underneath the small switchboard panel and is held in position by a safety catch. The steel side panel has been cut out just at the handle to provide additional space for the inserting of the hand for operating the hand brake.

The storage batteries of the car are charged from the line as well as through the compressor circuit. A battery-charging relay operates to connect the car batteries to line through a resistance whenever the pressure drops as low as 26 volts. With the batteries connected for charging directly from the line a 2-amp. charging current is received. The normal voltage for these batteries is thirty-four, and whenever this voltage is reached the battery-charging relay automatically cuts out. In normal operation the batteries are charged through the compressor circuit.

Electro-pneumatic line switches, Westinghouse type 267-E-9, are used on these cars. These are found desirable on account of the large number of times that the main operating circuit is opened and closed while going over gaps in the third rail.

Improvements in the electro-pneumatic brakes used provide for a quick application of the brakes throughout a train at all times whether they are applied pneumatically or with the electric features cut out. An indicating pilot lamp is connected so as to show whenever the brakes on a car are cut out. This pilot lamp is located inside the car just to the right of one set of the end side doors, and its conspicuous location insures that cars are not operated in service with brakes cut out unless it is essential due to trouble on that particular car. The motorman is then advised of the condition, so that safe operation is assured.

California Association Meets

THE sixth annual meeting of the California Electric Railway Association was held at the Palace Hotel, San Francisco, on May 11. At the close of the meeting W. R. Alberger, vice-president and general manager of the San Francisco-Oakland Terminal Railways, was re-elected president for a third term. W. V. Hill was re-elected manager, and the executive committee, composed of the following, also was re-elected: Paul Shoup, president Pacific Electric Railway; W. E. Dunn, vice-president Los Angeles Railway; William Clayton, vice-president San Diego Railway, and William von Phul, president Market Street Railroad.

W. V. Hill, the manager, is now in Washington, D. C., having accepted the office of Washington representative of the tax committee of the National Utilities Association.

Applying the Stethoscope to Machinery

A RECENT issue of *Engineering*, London, gives details of an ingenious scheme for permitting supervision of the condition of bearings and other vital parts of machinery. A specially constructed telephone microphone is screwed to each bearing or other possible source of trouble and supplied with current from a dry battery cell. All of these "trouble detectors" are wired to a central point where a simple switchboard permits plugging in of a telephone receiver on the circuits in succession. A milli-ammeter forms a part of the switchboard and is used to insure the continuity of the test circuit, so that silence in the telephone due to a broken circuit may not be taken as an indication of a perfect bearing. This device is an application and extension of the familiar stethoscope used by physicians in studying the action of the human heart. It virtually places the ear of the superintendent at every essential bearing in the plant.

Elimination of Waste

Report of Engineering Council's Committee Contains Concrete Suggestions Which Are Applicable to all Industries—High Labor Turnover One of the Commonest Wastes

THE report of the American Engineering Council's Committee on Elimination of Waste in Industry was presented on June 3 to the executive board of the Council in St. Louis. After discussion on the acceptance of the report, its publication was authorized not as a report of the Council but as the findings of the committee.

The report declares that between 4,000,000 and 5,000,000 workers were idle during January and February of this year, that billions of dollars are tied up in idle equipment and that high labor turnover is a rough index of one of the commonest wastes. Nationwide machinery to obtain continuous information concerning unemployment conditions throughout the country is called necessary, means for regularizing employment in the principal industries is urged and an elaborate plan of nationwide co-operation between the government, the public, trade associations, the industries, labor, bankers and engineers is outlined.

The waste inquiry was in charge of a committee of sixteen headed by J. Parke Channing of New York as chairman and considered particularly the industries of housing and building, ready-made men's clothing, shoes, metal trades and printing, but the results are said to be typical of all industries in all parts of the country.

The economic loss annually from preventable diseases and death according to the report is over $3,000,000,000; 42,000,000 persons gainfully employed lose 350,000,000 days from illness and disease and non-industrial accidents annually; 42 per cent of the wastes of ill health is preventable. In 1919 there occurred in industry 3,000,000 accidents, resulting in an economic loss to the country of about $853,000,000.

Trade associations, it is declared, should help and can do so, among other ways, by promoting programs for standardization of production of cost accounting methods, of material specifications and of equipment and by encouraging industrial research.

The duties of management include a reduction of the high labor turnover, establishment of improved relationship with employees, maintenance of inspection control, and detailed planning of work in advance.

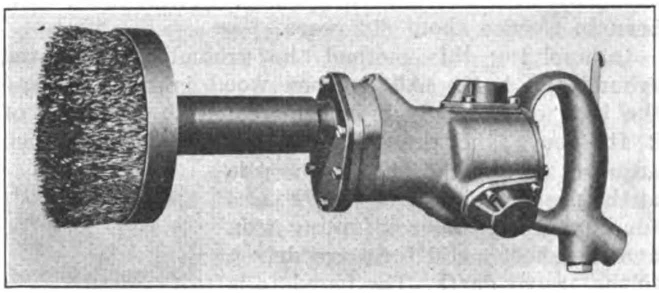
Organized labor, the report says, should develop a policy for increasing output; the attitude of opposition or indifference to proper standards for production should be changed to a frank and aggressive insistence on such standards; there should be a scientific examination of the bases for wages; certain union rules should be modified in regard to machine operation, apprentices and craft distinctions which result in restriction of output, and individual workers should realize their responsibilities for waste resulting from ill health and disregard of safety measures.

The banking interests, it was said, should especially encourage the stabilization of industry, and it is the duty of the engineers of the nation to support a wide and more thorough research into the following problems: Collective bargaining, hours of labor; methods of compensation; means of preserving and stimulating the creative instincts and the pride of craftsmanship of industrial workers; a standard labor and management terminology; common principles for the methods of management, and the measurement of production standards.

The building industry was said to be about 60 per cent efficient. In the shoe industry the waste is put at about 35 per cent. The average plant in the metal trades group is from 25 per cent to 30 per cent behind the best plant in output per employee. In the ready-made clothing industry, the report says, it should be relatively easy to save three-quarters of a million dollars a day—an increase of 40 per cent in effectiveness.

Wire Brush Cleaner Attachment for Air Drill

WIRE brush cleaning of metal surfaces offers an opportunity for saving time and labor over that required by hand methods for removing paint, rust, scale, etc. Manufacturers have found difficulty in obtaining a wire brush of proper design and material which would work effectively and still not wear out too rapidly. A wire brush of very rugged design has recently been placed on the market by the Ingersoll-Rand Company, New York, which is intended for use with its standard No. 6 "Little David" drill. The face diameter of this brush is 5 in. and the wires are made of special heat-treated steel, which has been found to possess good wearing qualities.



AIR-OPERATED BRUSH CLEANER ATTACHMENT

The No. 6 drill which is used with this brush has bearings designed particularly to take up the end thrust when pressing down on the work and the motor has a particularly high speed, which is also desirable. The whole outfit weighs but 11½ lb.

A New Structural Material

A NEW structural material called "Plymetl" has been produced by the Haskelite Manufacturing Corporation, Chicago. It is a composite of wood and sheet steel. It is manufactured by cementing thin sheet-metal faces to a relatively thick core of lightweight material. The two sheet-metal faces form smooth, impervious and durable surfaces. The non-metal core places the faces relatively far apart, giving the material great strength for its weight. Plymetl is furnished from stock in panels 3/16 in., ¼ in. and 5/16 in. thick, with faces of black or galvanized sheet metal, No. 30 gage, and with planed fir wood veneer cores. These panels are made 30 in. by 96 in. and weigh 1.6 to 1.8 lb. per square foot. It is also manufactured to order in 24, 26, 28, 30 and 36-in. widths and in lengths of 96 and 120 in., and in thicknesses from 3/16 in. to ¾ in. The material can be cut with light machine shears and such cutting gives a desirable bevel to the edges.

A panel of this material, 5/16 in. thick and made up of No. 30 gage sheet steel and fir wood core and weighing 1.8 lb. per sq.ft., is claimed to have eighty times the stiffness of a sheet steel of the same weight, namely, No. 19 gage. Its elastic limit in bending is claimed to be about five times that of the No. 19 gage sheet steel. The shearing strength of the cement that binds the metal to the core is even greater than the shearing strength of the wood.

Some of the advantages claimed for this new product are that it is strong and of light weight, that the even surface afforded by the metal does away with the cheap appearance of sheet metal, that the wood core takes away the metallic sound of sheet metal, and that the material will stand great abuse. Its use is suggested for car roof, interior panels, bins and shelves.

Repairing Decayed Poles

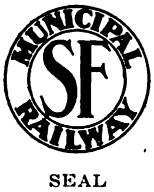
THE George C. Eggers Company, distributer of the Harding process for the reinforced concreting of pole butts, has given some results of the use of poles with concreted butts used by the Kootenai Power Company at Cœur d'Alene, Idaho. These have now been in service about six years.

DECAYED POLE WITH CONCRETE BASE APPLIED

In applying this method the ground is excavated around the butt. All decayed wood is removed and the butt of the pole is brush-treated to a height of 2 ft. above the ground line. A template is then adjusted around the butt of the pole at the proper height and twelve nails for supporting the reinforcing iron and the sheet metal form are driven to the proper depth. The template is then removed, the rings are put in place and the vertical tension rods are hung on. The lower form is then wrapped around the six lower nail heads and is backed up with earth as it is being filled with concrete. The lower form is next withdrawn and the upper form is adjusted at the proper height around the upper and lower nail heads, and a rubber form for casting the sealing groove is wrapped around the pole and tacked in place. The upper form is then filled with concrete and the top is sloped and smoothed off by means of a trowel. After twenty-four hours the forms are removed. When the concrete has become thoroughly dry the groove around the pole as well as the checks in the pole itself are well filled with a special sealing compound which is applied hot. The use of this process makes it unnecessary to replace old poles due to ground-line rot, as the concrete reinforcement can be applied to give a substantial construction and add much life to that of the pole.

Seal Replaces Lettering

A CONSIDERABLE saving in paint and painters' time is expected to result from a recent decision to do away with all lettering on the San Francisco Municipal Railway cars and to substitute a simple seal. Inasmuch as the municipal cars are painted a distinctive gray color, the seal will serve all purposes as well as the more elaborate lettering, it is believed. The seal bears the words Municipal Railway in letters 1¾ in. high encircling the letters S. F. All letters are of gold leaf with 1/16-in. black borders. The diameter of the outermost circle is 15 in.



SEAL

Letter to the Editor

Stick to Safety-Car Design Standards

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., June 6, 1921.

To the Editors:

I have read with much interest the article by J. C. Thirlwall of the General Electric Company appearing in the issue of the ELECTRIC RAILWAY JOURNAL for April 16, 1921, and again the article of May 7 by W. H. Heulings, Jr., vice-president and general sales manager the J. G. Brill Company, both emphasizing the fact that there is no real reason for changing the design of the standard Birney safety car. I write to indorse their views.

It is one of the unfortunate phases of the electric railway industry, excusable in part on account of its newness, that some men in responsible charge of executive and operating departments believe that they are not measuring up to the expectations of the owners of the property and their local public unless they stamp their own individuality upon the property. They alter railway equipment that has proved generally successful elsewhere, forgetting that the real field for effort lies in the direction of initiative in design rather than in such changes. We are far from having reached standards in any respect, and in the field of car equipment it is improbable that one or even two or three types of cars will ever be generally adopted for general use. While the advantages to the purchaser of standardization are obvious, individuality in design on the part of the car builder, often involving patents upon parts, and the attitude of the purchaser in desiring to adhere to designs which are locally popular or which fit in with some well-founded policy, make such a course impracticable if not impossible.

It is particularly unfortunate, therefore, that certain properties should be engaged in efforts to make changes of doubtful value in the Birney safety car, the one prominent example of standardization falling within the scope of car design. It is the only example of consequence that illustrates what might be termed *standardization of design or direction of design.* Great credit is due the man who first conceived the idea of this car and those interests that first applied it. But credit is also due the manufacturers who have co-operated with the users in developing a standard car with standard electrical and mechanical equipment that has done much to keep down the initial price of the complete unit and to make possible prompt delivery of repair parts at reasonable cost. All of the manufacturing interests concerned are represented by a manufacturers' committee, of which the writer and one other railroad employee are members. In this every consideration is given to the further improvement of any part or feature of the car and its equipment and with especial reference to keeping down car weight. The sentiment is against increasing the weight without a real and compensating advantage.

Probably many one-man double-truck cars will be operated in the near future, cars fully equipped with the safety devices now used on the Birney car. I believe that there will be a very general adoption of such cars, either through the modification of existing cars or the acquisition of new units more suitably equipped for economical operation. But this is entirely separate from the suggestions that have emanated from a few quarters to the effect that "something different" be furnished, thereby entailing additional first costs and future operating costs.

What is needed are broader conceptions of the principles involved, closer co-operation with the manufacturers in the development of standard railway equipment of whatever character, and less effort to change unnecessarily what some one else has designed in the effort to obtain the highest efficiency and the greatest economy in the management of properties that now need such a service as never before. W. G. GOVE,
Superintendent of Equipment.

Association News

Committee of One Hundred to Give Dinner

ANNOUNCEMENT has been made this week of a dinner party to be held on July 8 at the Commodore Hotel, New York, to celebrate the second anniversary of the creation of the Association's Committee of One Hundred. The dinner will be at 7 o'clock and the tickets are priced $7.50.

Each member company is invited, under the plan of holding the dinner, to send one accredited delegate. In addition the members of the Committee of One Hundred are also extended an invitation to attend.

The speakers' program calls for a review by President Gadsden of the activities accomplished during the existence of the Committee of One Hundred and an outline of what can properly be done in the future. In addition there are to be other speakers of prominence who are to talk on subjects that pertain to national situations other than the electric railway problem.

Recent Presidential Appointments

PRESIDENT GADSDEN of the American Electric Railway Association, chairman of the joint tax committee of the National Utilities Association, has appointed W. V. Hill, manager of the California Electric Railway Association, as representative of this committee. Mr. Hill's office is located at 950 Munsey Building, Washington, D. C., and all matters relating to federal taxation can be taken up directly with him there.

President Gadsden has appointed several new members on the American Association committee on company sections and individual membership, the personnel of which is now as follows: Martin Schreiber, Public Service Railway, Camden, N. J., chairman; P. S. Arkwright, Atlanta, Ga.; J. P. Barnes, Louisville, Ky.; F. G. Buffe, Kansas City, Mo.; J. H. Mallon, Chicago, Ill.; H. H. Norris, New York, N. Y.; Charles C. Peirce, Boston, Mass.; E. F. Wickwire, Mansfield, Ohio.

Chicago Men Well Entertained

THE monthly meeting of the Chicago Elevated Railroad company section was held on May 17, with an attendance of about 150, with President J. H. Mallon in the chair. F. W. Shappert, who accompanied Secretary Denby on his recent inspection of the Atlantic fleet, reviewed this event with the aid of stereopticon slides. H. A. Johnson, organization engineer Chicago Elevated Railroads, talked of his recent trip through the West as the representative of the Elevated Railroads on Mayor Thompson's Chicago transportation committee.

Stock Offering to Employees at Section Meeting

THE regular monthly meeting of company section No. 13 was held on May 19, at Camden, N. J., with a large attendance. President C. V. Wallace introduced E. G. C. Bleakley, city solicitor of Camden, who, in his talk, spoke on the way in which the general public left the responsibility to the operators of the trolley cars, depending on them for their safety and speed in being taken from town to town. He added that the trainmen not only received the pay which comes in an envelope but also that which comes from the appreciation of the daily riders, who place their confidence in these worthy men for work well performed. Martin Schreiber, manager of Southern Division Public Service Railway, outlined the plan of the Public Service Corporation under which it plans to sell $2,000,000 of cumulative preferred stock to the general public and employees at the par value of $100 per share, payable $10 down and $10 monthly. The stock is to pay 8 per cent, and 6 per cent is allowed during the time that payments are being made. He outlined also the many advantages to be derived from having the general public as part owners of the corporation.

Spraying Car Cleaner Fluid

AT THE Wheaton Shops of the Aurora, Elgin & Chicago Railroad H. A. Barbero, master mechanic, is working on a plan of using Wilson ONC cleaner by spraying it on under the 90-lb. shop air system pressure, instead of rubbing it on by hand. The hand method of cleaning takes four men about four hours per car. Experiment has gone far enough so that it is thought that four men will be able to clean a car in one hour with the spray method, assuming that proper equipment is afforded, including a tank at either side of the car. The present facilities at the shop are limited and it is necessary to place the car first on one track and then on another in order to get space in which to spray both sides. It is planned to build a shed outside of the shop particularly for car-cleaning.

The ONC cleaner is diluted with water and the car sprayed all over and then permitted to set about ten minutes. A wet brush on a long handle is then run over the car, windows and all, and they are rubbed as much as can be with this soft brush. The whole car is then rinsed down with a fountain brush. This latter process avoids the necessity of wiping the windows. The spray process requires about one-quarter more of the fluid than the hand process. At the same time, it saves considerable labor and provides a cleaner car, mainly because it will be possible to clean it more often with the same force of men. The present cleaning system is inadequate, though it is costing the company a large sum. At the Chicago terminal alone $35 a day is being spent for cleaning cars on the inside only. It is planned ultimately to do away with this $900 a month charge entirely at Chicago by concentrating all of the car-cleaning work at the shops, and it is believed that this can be done with the present working force under improved methods.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Railroad Labor Board Cuts Wages 12 per Cent

Highest Reduction of 18 per Cent on Section Workers Should Provide Stimulus to Track Construction

Reductions in the pay of railway workers averaging 12 per cent for all classes of employees have been authorized in the decision of the United States Railroad Labor Board handed down on June 1. The decrease becomes effective July 1, on which date the national working agreements are also abrogated. Nullification of these agreements, it is estimated, will mean a saving of about $300,000,000 annually to the railroads of the country, while the wage decrease is expected to lop off about $400,000,000 more.

The decision in general grants reductions of from 5 to 13 cents per hour or about 5 to 10 per cent, and reduces section laborers approximately 18 per cent, in this instance completely wiping out the increase in pay granted that class of employees in the $600,000,000 wage increase of July 20, 1920. On other classes of workers, however, the wage reduction does not meet the increase in pay granted last year, and some disappointment over this has been expressed by the railroads. It is significant, however, that the largest decrease, or 18 per cent, affects section workers, for with lower costs in maintaining and constructing track, greater activity in this much neglected field may logically be expected.

Segregation of City and Suburban Lines Talked

While no definite future policy has been announced for the Detroit United Railway since the election of Harrison Williams and Alex Dow as directors, city officials believe that one of the main steps to be taken by the new organization will be the segregation of the city lines from the interurban system. It is also believed that the policy indicated by the company in agreeing to sell the day-to-day and non-franchise lines at such times as the city desired, and in agreeing to co-operate with the city in the matter of crossings by the municipal line, will be followed with a view to harmonizing the company and the city in the city's municipal program.

If complete harmony results, the disposal of the company's entire city system to the city would ultimately result in bringing about a unified municipal system, although it is not believed by city officials that a project to take over at one time the entire city system of the Detroit United Railway would be approved by the voters.

Following the defeat of the service-at-cost ordinance at the April election the company signified its willingness to allow the city to make crossings at the intersection of the municipal ownership lines and the company's lines. Agreement has been reached between the company and the city providing for submitting the matter of crossings to the United States Bureau of Standards.

The city officials hold that the company and city should share equally the cost of crossing non-franchise and day-to-day lines, while in general practice the junior system bears the entire cost. The Corporation Counsel claims that the company has no rights on such streets except by permission of the city. Company attorneys do not accede this point and cite that the company is willing to sell the non-franchise lines on Fort Street and Woodward Avenue when the people vote to purchase them.

D. U. R. in Charge of Administrative Committee

Announcement was made in New York on June 7 that the operating properties of the Detroit (Mich.) United Railway will be in charge of an administrative committee composed of Harrison Williams, New York, as chairman; Alex Dow, president of the Detroit Edison Company, recently elected a director of the railway; J. C. Hutchins, A. F. Edwards and R. W. Martin. This committee, just formed, will immediately consider the problem with which the Detroit United Railway is confronted. At the present time there is no announcement to make regarding any future plans or policies. It is not anticipated that any further changes will be made at this time in the board or in the operating organization.

Third Des Moines Arbitrator Chosen

After more than a month's dickering in trying to secure a third arbitrater to hear the wage dispute between the Des Moines (Iowa) City Railway and its union employees Judge Scott M. Ladd, for many years member of the Iowa Supreme Court, was agreed upon by Rev. J. E. Kirbye, for the men, and B. F. Elbert, for the company. By reason of the fact that Rev. Kirbye plans to leave for Asia on June 22 it is thought that the wage dispute will now be pushed to a speedy settlement.

California Legislation Reviewed

Tax and Labor Bills Defeated Which Would Have Burdened Electric Railways Further

More than seventy bills were introduced at the recent session of the Legislature of California effecting directly or indirectly the electric railways of the state. The two most important measures were those dealing with taxation and hours of labor. A tax bill was introduced during the first half of the session providing for a uniform increase of 33 per cent in taxes of public utilities. As an illustration the bill proposed to increase the electric railways tax rate from 5¼ per cent of gross receipts to 7 per cent.

This measure resulted in one of the bitterest fights that has ever been waged in the Legislature of California. The first bill having passed the Senate was defeated by a narrow margin in the Assembly, whereupon a very similar bill was introduced in the closing hours of the first half of the session.

During the thirty-day recess the Governor and his administration stumped the state in advocacy of the passage of this measure. The public utilities and the banks, however, carried on an intensive campaign taking the position that, first, public utilities and banks were paying their just proportion of taxes as compared with general property taxes; second, that the state government was extravagant. They presented figures to substantiate the first claim and submitted facts with respect to the second claim showing that the budget could be cut many millions without impairing the proper functioning of the state's business.

The second bill passed the Senate by a margin of one vote, but was defeated in the Assembly by a margin of four votes. On reconsideration, however, over a period of ten days the Governor's machine supported by the farmers' association (fearing an ad valorem tax on their property), automobile interests and labor organizations, the bill was finally passed by the necessary two-third vote which is required on revenue measures. The electric railways succeeded, however, by an amendment to the bill, in avoiding the increase tax, but their representatives refused to abandon the fight after their interests were excluded from the measure. Thus about $3,000,000 will be saved to the electric railways during the next two years.

Companion bills providing for an eight-hour day within ten hours for electric railway platform men were introduced and were strongly supported by representatives of the Amalgamated Association. The Senate bill was reported favorably out of committee, but was defeated on the floor of the Senate by three votes after a strenuous fight. The Assembly bill was then taken up in committee, amended to read nine hours within eleven and was defeated in committee.

The bill against the one-man car was not taken up, the author realizing that it could not be passed. The electric railways were involved in an amendment to the "full-crew act," which bill was defeated in committee. Numerous bills were defeated, limiting the Railroad Commission's power with reference to contracts and franchises. Other bills were defeated requiring gangways or sidewalks along bridges, prompt adjustment of damage claims, construction of caboose cars, septic toilet retainers, abolition of grade crossings. The electric railways were excluded by amendments to other bills affecting their interests.

The indeterminate franchise bill in which all public utilities were interested passed the Assembly by a substantial majority, but was not pressed for passage in the Senate, owing to strong opposition brought to bear by the Governor as a result of the defeat of a bill providing for a power commission and the fight made by the public utilities against the tax bill.

A bill was passed repealing the paving section in the state statutes, which should bring considerable relief to the electric railways providing the Governor can be induced to sign it. Several bills were passed affecting the jitney interests, requiring them to file reports of their operations with the Railroad Commission and subject to restrictions on the issuance of free and reduced transportation; also placing them under constitutional amendment No. 1, relating to taxation, under which other public utilities are classified for taxation, and a bill imposing a 2 per cent license tax on motor carriers, which will apply until the amendment to the constitution becomes effective.

A constitutional amendment reclassifying public utilities for taxation purposes was passed. This will enable the electric railways to be classified separately from the steam railroads. On this measure the contention was made that the electric railways should be given a lower percentage than that of the steam railroads owing to the additional burdens imposed in their franchise conditions.

It is interesting to note that the automobile interests maintained the largest lobby of any interests represented.

Wage Reduction to Be Made.—Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad, has notified the employees of the company that effective on June 16 working conditions will be revised and wages reduced. The amount of the reduction and other changes to be made are under negotiation.

$1,022,276 Program

Duluth Company Gives Details of Work to Be Carried Out in Next Two Years.

Improvements, extensions and new equipment involving expenditures aggregating $1,022,276 are planned by the Duluth (Minn.) Street Railway within the next three years, according to schedules filed by the company with the State Railroad & Warehouse Commission supporting its previous request for an emergency fare of 7 cents or four rides for a quarter.

The program outlined includes several extensions which have been long contemplated, the construction of additions to the general shops at a cost of $305,000 in addition to the purchase of considerable equipment and the relaying of several tracks.

In setting forth its financial condition, the company asserts that if it were forced to comply with the City Council's request of Jan. 10 last for increased service it would have to spend $145,000 more annually for the increased cost of operation, or more than the company has been able to credit to profit and loss in any one of the last three years.

In addition, the company claims, it would have to lay out $196,000 in new equipment and it now faces litigation in which the city is asking more than $108,000 on account of paving about the track space on various streets.

A total of $345,000, or approximately one-third of the total expenditure, is planned for 1921, in the event that the request for an emergency fare of 7 cents is granted. If the commission grants the emergency fare the new rate will hold until engineers employed by the city and by the company have presented their figures on the company's valuation. After that the law provides that the permanent rate of fare shall be based so as to permit a reasonable return on a fair valuation of the company's assets.

The classification of the proposed expenditure of $1,022,276 for the next three years is briefly as follows:

In 1921	
Relaying tracks account street paving	$211,784
Conduits and underground feeders	46,683
Building improvements and renewals	23,134
New tracks	11,400
New equipment	55,000
In 1922 and 1923	
Relaying tracks, account street paving	$88,745
Conduits and underground feeders	8,270
Building improvements and renewals	345,100
New tracks	115,158
New equipment	120,000

The following is the income and expense account as presented to the state commission:

	1918	1919	1920	1921*
Operating revenues	$1,263,873	$1,477,701	$1,486,053	$475,931
Operating expenses	984,717	1,215,092	1,203,314	380,460
Net revenue	279,156	262,609	282,739	95,471
Operating income	209,972	177,937	192,206	65,956
Gross income	226,317	196,222	212,130	73,059
Total deductions from gross income (interest on bonds, amortization and miscellaneous debits)	127,311	125,382	125,618	41,734
Net income transferred to credit of profit and loss	99,005	70,840	86,511	31,325

* Four months.

Argument Concluded for New Plan at New Orleans

After several conferences with the City Commissioners and the Mayor, C. C. Chappelle, utility expert, brought to a close on June 3 his advocacy of the "assured service" railway plan for terminating the city's railway troubles. Mr. Chappelle in concluding his argument for the immediate adoption of the plan submitted by him drew a gloomy picture of the future of the city and the fate that awaited its people if those interested in its welfare delayed action further in the matter.

According to Mr. Chappelle the railway is carrying 50 per cent more passengers now than were carried in 1910 and has fewer cars now with which to do the work. Those responsible for the future of the company could not accept a valuation of less than $44,700,000 as a basis of settlement.

Wage Cut Accepted at Toledo

Trainmen in the employ of the Community Traction Company, Toledo, Ohio, accepted on June 7 the proposed wage scale of 45, 57 and 60 cents, which has been in operation for two weeks. They will continue their efforts to retain their vacations with pay. This matter was not voted on.

Negotiations for a new scale have continued since March. Two weeks ago the new scale was fixed by the company and since that time the men have been at work while international union officials attempted to have the matter arbitrated.

The men were first offered a cut of 2 cents an hour from their maximum of 60 cents. This was flatly turned down and further negotiations extended after the time of settlements made at Cleveland and Detroit, which cities set a pace for Toledo.

In addition to the cut of 10 cents an hour several changes in working conditions are also included in the new agreement. Overtime pay will be effective after nine and one-half hours' work rather than after ten as first proposed in the new agrement. Arbitration of wages is not provided for in the new service-at-cost franchise.

New City Official Suggests Settlement

Corporation Counsel Rules City May Control Buses and Fix Adequate Fares for Railway

Judge Miller, the new corporation counsel at Des Moines, Ia., has pointed out the way for the settlement of the railway problem there. Individual members of the Council have also expressed their opinions freely, but tangible action still remains to be taken. It is generally agreed that a settlement must be brought about quickly if Des Moines is not to suffer irreparable loss through further disintegration of its railway system.

REMOVAL of equipment from the substations and central power station of the railway was simply a business arrangement to which the General Electric Company was forced by the inability of the railway to meet payments due on the equipment supplied by the manufacturer.

At the very time the General Electric Company was authorized by Federal Judge Martin J. Wade to seize the equipment approximately $90,000 of the cost of the equipment remained unpaid. No criticism of the equipment was in any way attached and officials of the railway publicly announced that they could offer no objections to the General Electric Company starting suit to recover the property.

NEW FRANCHISE BURDENSOME

The entire Des Moines case offers an almost impossible situation to an unprejudiced observer, particularly one who is not a resident of the city. Five years ago, before the United States had entered the war that turned business conditions upside down, the railway sought and was granted a twenty-five year franchise with a fixed fare of 5 cents with six tickets for a quarter.

As the purchasing power of the dollar declined the railway, in common with many other public utilities, began to feel the pinch of the franchise rate provisions. In the summer of 1919 the question was submitted to the people of granting the company relief in the shape of a 7-cent fare. The proposition was defeated.

Shortly after this the North American Construction Company, Chicago, which had rebuilt the Des Moines plant, brought action to throw the company into the hands of a receiver, and since that time the company has been operated under the direction of the federal court with F. C. Chambers, general manager, and Homer A. Miller, a Des Moines banker, as receivers.

COURT INCREASED FARE

Last August Judge Wade over-rode the franchise provision and allowed a 6-cent fare. This failed to furnish sufficient revenue to meet wage awards secured to the men through arbitration and later there was a material service cut. A few months ago Judge Wade again reviewed the case and upon the agreement of the railway to increase service approximately 45 per cent he granted an 8-cent fare.

With the fare increased to 8 cents a flock of motor buses appeared, handling largely the short haul business and charging a nickel fare. By this time wage and salary reductions were well under way and Des Moines in common with the rest of the country suffered a considerable business depression which to a great extent still prevails.

The bus operators pooled their interests and have a fairly compact organization. They operate almost exclusively along railway lines and have picked up the cream of the business. Their service, however, is intermittent and unreliable. As an example Des Moines had her heaviest snow of the winter after the middle of April. Buses were helpless until the streets had been cleaned by railway sweepers.

With their incomes decreased Des Moines people have looked at the 3 cents to be saved by patronizing the autos, have ignored the merits of the question and have ridden in the buses, with the result that for the past three months the railway has been operating at a deficit which has been increasing steadily.

When the General Electric Company refused to wait longer for payment on equipment supplied and Judge Wade allowed a 46 per cent service cut, fair-minded citizens were of the opinion that this would serve as the last straw and that the city would be so aroused that the agitators would be squelched and a way found to settle the difficulties.

PROBLEM ALLOWED TO DRIFT

To date this has failed to be the case. Des Moines has sat placidly back and let the railway problem take care of itself. It is true that a Chamber of Commerce-Greater Des Moines committee has three representatives working on a service-at-cost franchise and that a few organizations have held meetings but there has been no general popular demand for a solution.

The City Council has been as lackadaisical as the citizens and even in the face of advice from its new corporation counsel that it had the right to take the situation into its own hands, rule the buses off the street and fix a fare which would permit the railway to operate successfully, no real steps have been taken to bring the farce to an end. Five days have elapsed since Judge Miller sent his first communication to the Council and on June 6 he reiterated the opinion expressed by him previously, in answer to a newspaper editorial. There have also been newspaper interviews from individual members of the Council, but nothing tangible has been done.

More than a week ago the president of the bus owners' association said that if the city would grant a franchise for a definite term of years they would put eighty buses in service and guarantee to handle the traffic. To date the matter has been entirely newspaper talk, and nothing has developed.

Judge William E. Miller, newly appointed Corporation Counsel in Des Moines, Ia., who has displaced H. W. Byers in charge of litigation between the city of Des Moines and its public utilities, forecast a complete change of front for the city in its relations with the Des Moines City Railway in a sweeping opinion which he filed with the City Council late during the week ended June 4.

Judge Miller not only advised the Council that it had full power to rule the buses off the streets, but that it had the power to increase railway rates without a vote of the people. He held that the franchise ordinance passed a few years ago was invalid.

Judge Miller suggests that the buses be ruled off the streets entirely or be compelled to operate on streets other than those occupied by railway tracks. A portion of his opinion is as follows:

> Assuming that the city through its Council had and has power to regulate fares by franchise, contract or by ordinance (a power the city never had and does not have now), and assuming that the 5-cent fare and transfer privileges provided for do not yield a fair return to the owner, it would be within the power of the Council to change the fare provisions.
>
> The state courts have held that a franchise ordinance or a contract between a city and public service corporations fixing a flat rate as is done in your ordinance No. 2406 is invalid. Cities such as Des Moines have no right to fix street car rates. The rate clause in the franchise ordinance No. 2406 is and always has been void.
>
> It is manifest that the competition of the buses is proving ruinous to the railway. The company shows an estimated deficit of $46,000 a month. A new franchise, however liberal in its general terms, would not remedy this condition if unfair competition were still permitted. Ordinances passed by the Council regulating buses could be revoked at any time. The way is open to you to remove the buses that are competitors destructive of the railway. It may be they could serve in other territory without material detriment to the car company. There is an obligation on the part of the city not to obstruct efficient car service.
>
> I am inclined to believe, or at least to hope, that if the foregoing propositions are wisely and fairly handled a strong inducement would be furnished the owners of the Des Moines City Railway and its creditors to back the enterprise with additional funds and rehabilitate the physical property.

Judge Miller's stand is a complete opposite to the baiting methods adopted and maintained by Mr. Byers during his ten years as Corporation Counsel. It came as a surprise to members of the City Council when read to them in open meeting. No definite action was taken at the meeting.

Iowa Electric Railway Association

The Iowa Electric Railway Association will hold its annual meeting at "The Inn," Lake Okoboji (near Spirit Lake, Iowa), on June 24, 1921.

The Iowa Section, N. E. L. A., is holding its annual meeting at the same time and place, and it is intended that on Friday morning a joint session will be held to consider subjects of mutual interest and on Friday afternoon a separate "round-table" discussion of matters of particular interest to street railways will be conducted.

Wages Cut Materially in Jackson

New rates of wages were put into effect by the Michigan Railways, Jackson, Mich., on June 1. These rates in cents per hour compared with previous rates are as follows:

	June 1, 1920 to June 1, 1921	June 1, 1921 to June 1, 1922
City Divisions		
First twelve months	60	44
After twelve months	62	46
One-Man Safety Cars		
First twelve months	60	49
After twelve months	62	51
Interurban Divisions		
First six months	65	49
After six months	70	54
Extra Work		
Work in excess of regular runs	10 addl.	5 addl.

Extra men are not to participate in the 5 cents per hour additional until they have been in the service of the company for six continuous months. City men transferred to interurban work will participate in the 5 cents an hour additional after they have been in interurban service six months.

Wage Cut Proposed by Jersey Company

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., operating about 1,000 miles of line, has notified William Wepner, of the Amalgamated Association, that the company cannot renew the present contract with the men. That agreement expires on Aug. 1. The present scale calls for 51, 53, and 55 cents an hour. Mr. McCarter desires to revert to the award of 41, 43, and 45 cents an hour made by the War Labor Board in 1918.

In his communication to Mr. Wepner, Mr. McCarter says:

> It must be apparent, I think, to you and your associates that these companies are not in a position to pay the rates of wages set forth in the draft of contract nor to continue after Aug. 1 the rate of wages now being paid.

While no distinct mention is made in the correspondence of the new scale sought by the men it is understood that the employees desire a continuation of the present rates, but seek important changes in the other terms of the operating arrangements. In their communication to Mr. McCarter the men, through Mr. Wepner, "respectfully insist that the financial condition of any company does not determine a reasonable and living wage and further protest that the profits of an industry shall not be obtained through the unreasonable lowering of any already very low standard of living."

Mr. McCarter refers to the recent unsuccessful effort of the company to obtain relief in the matter of advanced rates, also to the inability of the company to secure just consideration at the hands of the public authorities with respect to the regulation of the jitneys. In this connection he says:

> Thus far, however, all its efforts have failed, and in addition to having had practically no money for the depreciation reserve account and none whatever for dividends it has lost upward of $2,000,000 in operating the property in the last three years.

Mr. McCarter said in his communication that quite a number of matters of lesser importance than the question of wages are referred to in the draft of contract submitted, and suggested that these could best be threshed out to a friendly basis of agreement by negotiations between the committee of the union and the company's own operating forces.

Byllesby Property Suffers Loss

The greatest damage to electric railways in the recent Colorado flood was suffered by the Arkansas Valley Railroad, Light & Power Company, a Byllesby property operating in Pueblo. This loss is estimated at $100,000. One of the officials of the company has announced that electric current would be supplied by the Colorado Fuel & Iron Company. He said he was confident of being able to run the electric cars in a few days. Every attention is being given to equipping the local utilities so that operation will be resumed as early as possible.

News Notes

Railway Opportunity at Miami.—The Miami Chamber of Commerce and all other civic bodies, as well as the City Council, desire to secure an electric railway for the city. They will gladly assure their assistance in getting a franchise without restrictions as to rates, paving of streets or other outside expense. Additional information may be obtained from the City Council or the Chamber of Commerce.

Arbitrators Selected for Wage Matter.—The five arbitrators have finally been selected to hear the arguments of the Utah Light & Traction Company, Salt Lake City, Utah, and its employees over the proposal of the company to reduce wages 25 per cent. The five arbitrators are: George H. Dern, the neutral member; A. L. Hoppaugh and Stephen H. Love, representing the traction company, and George H. Islaub and James H. Wolfe, who represent the employees. The first session of the arbitration board was held on May 27.

Interurban Men Accept Cut.—Trainmen and freight handlers and motormen and conductors of the Cincinnati & Dayton Traction Company, Hamilton, Ohio, have accepted a decrease in wages after the matter had been referred to arbitration. Affecting approximately 150 employees the reduction makes a decrease of 5 cents an hour in wages of freight helpers and of 3 cents for motormen and conductors. Although the trainmen demanded 80 cents an hour, where they were receiving 51 cents, arbitration resulted in trainmen being offered 48 cents and freight helpers 40 cents an hour, commencing on June 1.

Program of Meeting

C. E. R. A. Summer Meeting

The tentative program for the summer meeting of the Central Electric Railway Association, which is to be held on board the S.S. *South American* en route from Toledo to Chicago by way of Lake Huron, St. Mary's River, the "Soo" Locks, Mackinac Island, Lake Michigan, Green Bay, Sturgeon Bay and Benton Harbor, has been drawn up by the program committee, of which Sam W. Greenland, Fort Wayne, is chairman.

Two formal sessions have been arranged, one on Wednesday morning, June 29, and one on Thursday afternoon, June 30. The subject that will be treated on Wednesday morning is "Automatic Substations," led by a paper by C. A. Butcher, Westinghouse Electric & Manufacturing Company. As there has been a feeling on the part of a number of the electrical engineers that there has not been opportunity at any meeting to give this subject the full discussion warranted, and as this subject is now up for very keen study in many cities and on many interurban lines, the committee has planned that ample time shall be given for a full discussion. Several written discussions will be presented by men particularly able and experienced in this study and several other electrical engineers are taking the trip expressly to hear this discussion and to take part in it.

On Thursday afternoon the theme is to be "Merchandising Transportation." This subject will be led off by the report of the Committee on Education and Training of Employees, of which James P. Barnes, Louisville, is chairman. Mr. Barnes has been giving the training of employees, particularly that phase of the subject looking to their functioning as salesmen for the company, a great deal of study, and it is expected that he will have some very worth-while thoughts to express to the association.

Arrangements are being made for running several special cars from various points in Indiana and Ohio to Toledo or Chicago, where the members will embark on the cruise. As a great many of the members desire to make the entire trip from Chicago to Toledo and return, leaving Chicago Sunday morning, June 26, at 8:30 a.m., it is expected that some of these special cars will be routed to Chicago. The committee on arrangements, for which John Benham, 15 South Throop Street, Chicago, is acting as secretary, reports that reservations from the railway men are coming in satisfactorily and that every effort is being put forth to furnish plenty of entertainment and to insure a highly successful meeting and trip. As the meeting of the association which voted to have a boat trip this summer was unanimously and enthusiastically for the boat trip and was unwilling to substitute anything else it is expected that there will be a large attendance.

Financial and Corporate

New Bedford Earnings Gain

Nearly 12 per Cent Return on Capital Stock from a Five-Cent Basic Fare

The annual statement of the Union Street Railway, New Bedford, Mass., shows a surplus of $92,630 after payment of 8 per cent dividends on capital stock for the year ended Dec. 31, 1920, as compared with a deficit of $28,435 the previous year. This is especially notable as the city lines are still being operated at a 5-cent fare. During the year, however, transfers were eliminated, and a traffic center in the heart of the city was established, beyond which a second 5-cent fare is charged. This company also operates a 14-mile suburban line between New Bedford and Fall River, on which a 25-cent fare is charged. The company owns and operates two summer amusement parks which it reports are self-supporting. According to the 1920 census, New Bedford has a population of 121,217.

INCOME STATEMENT—UNION STREET RAILWAY COMPANY

Year ended Dec. 31	1920	1919	Per Cent Change
Gross earnings from operation	$1,729,396	$1,439,769	20.12
Operating expenses	1,303,582	1,123,851	15.97
Net operating revenue	$425,814	$315,918	34.80
Non-operating income	3,570	1,090	227.00
Gross income	$429,384	$317,008	35.4
Deductions from gross income:			
Interest on funded debt	$11,250	$11,250	....
Interest on unfunded debt	16,510	16,076	$2.70
Taxes	113,994	123,118	*7.41*
Total deductions	$141,754	$150,444	5.77
Net corporate income	$287,630	$166,564	72.80
Dividends, 8% on $2,437,500 capital stock	195,000	195,000	....
Surplus for the year	92,630	*28,436*	....
Surplus end of preceding year	322,314	402,782	....
Adjustments of losses and depreciation	*2,511*	*52,032*	*95.2*
Surplus end of current year	$412,433	$322,314	28.0

STATISTICAL INFORMATION—UNION STREET RAILWAY COMPANY

	1920	1919	Per Cent Increase
Number of revenue passengers carried	31,730,868	27,354,946	16.03
Number of revenue passengers per mile of main track	755,496	592,552	27.50
Passenger car-miles run	3,046,484	3,015,824	1.02
Number of employees as of Dec. 31	514	480	7.08

Italics indicate deficit or decrease.

Fixed Charges Earned by Beaver Valley Line

According to the annual report of the Philadelphia Company two of its subsidiary traction properties, the Beaver Valley Traction Company and the Pittsburg & Beaver Valley Street Railway, were operated very successfully during the year, and at a time most difficult to formulate and carry out a new policy.

During the year, the report says, a new 5-cent zone fare system was established with the zones located to take care of the short haul travel within the various boroughs. The unusual condition of high labor cost and high material cost which prevailed was offset to a large degree by the thorough co-operation of the cities, towns and municipalities along the line (particularly by the chambers of commerce and boards of trade at these places), together with the active and earnest consideration of the employees. With such co-operation it was possible so to operate the properties as to serve the people better and earn fixed charges.

Much, however, has yet to be done to give better car service to meet the demand for transportation in this rapidly growing industrial community, and it is expected that with the continued co-operation of employees and the public-spirited citizens it will be posssible to improve the service constantly, so that within a reasonable time every proper demand for these facilities can be met.

Gross earnings for the calendar year were $705,242, an increase of $114,136, or 19 per cent more than those for the previous year, while the net income of $3,189, together with certain credit adjustments, enabled the deficit, which at the commencement of the year amounted to $342,243, to be decreased by $16,222. The car mileage operated during the year was 1,544,335, an increase of 21,583 miles, or 1.4 per cent over the previous year.

Five new safety cars for one-man operation were purchased during the year and have proved satisfactory in every respect. Thirty per cent of the price was paid upon delivery, and the remainder will be paid from earnings. It is expected further to increase the number of such cars in service so that a more frequent service can be provided. This increase in service, it is hoped, will be reflected in the earnings.

Wider Securities Market

Representatives of N. E. L. A. and Members of Chicago Stock Exchange Discuss Plan

At a conference between representatives of the National Electric Light Association and members of the Chicago Stock Exchange in Chicago on June 2, at the time of the annual convention of the N. E. L. A., plans were discussed for establishing a wide market in Chicago for public utility securities. The plan would be to list on the Chicago market all of the leading utility securities of the country, give publicity to utility companies and create a broad market for the securities of these companies. It was pointed out that while there are $21,000,000,000 of these securities in the hands of the public there is an open market now for only a small portion of such issues.

Samuel Insull, president Commonwealth Edison Company and other utilities, said:

> There can never be a real market in utility securities until we have a free and open market. Take the Commonwealth Edison Company. Its various issues are listed, and its securities have never been more easily salable. I am a very strong believer in the public having the full light of day shed on any of the affairs of the utilities with which I am affiliated, and that comes when the securities are listed. I believe it would do the utility industry good. Chicago is the natural place for such a market and I welcome any interest bringing its securities to Chicago for sale.

It is the plan of the members of the Chicago Stock Exchange and the bankers to go ahead at once with the work of broadening the market for utility securities in the hope of making Chicago the great central market for utility securities just as Boston is for the coppers.

Suspension Suggested Pending Better Business

The North Carolina Public Service Company has thrown itself on the mercy of the State Corporation Commission with respect to the future operation of its lines in Concord. The lines there consist of 3 miles of track and 3 cars. An 8-cent fare is charged. The population served is less than 10,000.

The plant with all equipment is valued at $123,000. Last year the company spent $1,800 in actually running the cars, and $5,000 more on paving required in the franchise. Business is still falling off with the idleness of many of the cotton mills, and the owners of the property seek the advice of the commission with respect to the future of the road.

Ten-cent fares were suggested as a remedy, but neither the commission nor the municipal authorities thought that 2 cents added to present rates would materially increase the gross income. It was suggested that the line suspend temporarily business in the hope of better conditions, but this plan was not generally acceptable. No further suggestion was offered, and the commission took the matter under advisement.

Answers to Accounting Questions

Another Series of Questions and Tentative Answers Under the Uniform System of Accounts for Electric Railways

Another series of tentative answers to questions raised in connection with the uniform system of accounts, prescribed by the Interstate Commerce Commission, has just been issued. As these answers have not received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

THE case numbers covered below are from A-565 to A-587, with certain omissions. Other installments will follow. The omitted numbers represent cases which either are not of sufficient importance to justify publication or involve questions upon which a definite conclusion has not been reached.

Q. (*A*-565). To what account should be charged the pay and expenses of a detective employed to recover stolen feed wire and to apprehend the thieves?

A. To account 23, "Miscellaneous electric line expenses."

Q. (*A*-566). To what account should be charged the excess of liabilities over assets acquired in connection with the purchase of a road?

A. The excess shall be considered as part of the purchase price and charged to account 527, "Cost of road purchased," from which it shall be cleared to the appropriate primary accounts as provided in the text of that account.

Q. (*A*-567). To what account should be charged the cost of water supplied to an automatic sprinkler system in car barns?

A. To account 24, "Buildings, fixtures and grounds."

Q. (*A*-568). A carrier's coal crane is occasionally used by others for unloading their material. To what account should be credited amounts received for such use?

A. To account 117, "Rent of buildings and other property."

Q. (*A*-570). To what account should be charged the pay of a watchman at a power plant, the operation of which has been suspended?

A. To account 52, "Power plant employees."

Q. (*A*-571). A carrier pays dues of its officers and other employees in various clubs, business organizations, and associations. What should be the accounting?

A. Dues of traffic associations are chargeable to account 82, "Miscellaneous traffic expenses." Dues of other railway associations are chargeable to account 89, "Miscellaneous general expenses." Dues paid to other organizations for employees not in connection with the general management of the company shall be charged to the accounts to which their pay is charged.

Q. (*A*-572). The tax on income of a given year is not payable until the succeeding year. In the accounts of which year should the charge be made?

A. The tax is chargeable and should be set up by accruals in the accounts of the year in which the income accrues.

Q. (*A*-573). To what account should be charged the loss, other than depreciation, on a passenger car converted to a service car?

A. Loss assignable to the period subsequent to July 1, 1914, shall be charged to account 41, "Equipment retired," and loss assignable to the period prior to that date shall be charged to profit and loss account 315, "Loss on road and equipment retired." (See Cases 183 and 315, Accounting Bulletin 14.)

Q. (*A*-575). A carrier acquires an option on a piece of property, the consideration for the option being an immediate partial payment and payment of interest on the remaining amount of the agreed purchase price. What is the correct accounting?

A. The amount paid for the option, together with the interest accrued, shall be charged to account 420, "Other unadjusted debits," and carried therein for the period the option is pending. No entry shall be made during that period for the full cost of the property to which the option pertains. If purchase is consummated the amounts charged to account 420 shall be transferred to the appropriate asset account. If purchase is abandoned the amount in suspense shall be charged to account 317, "Miscellaneous debits."

Q. (*A*-577). A carrier's operations of miscellaneous physical property show in some months a net income and in other months a net loss. What is the proper method of using accounts 205, "Net income from miscellaneous physical property," and 219, "Net loss on miscellaneous physical property," in connection with these operations?

A. Ledger accounts may be set up to show separately the revenues and expenses of the operations, and when periodical or annual income statements are made the net balance of the two accounts shall be assigned to account 205 or to 219, as may be appropriate.

Q. (*A*-578). To what account should be charged the net loss sustained on account of the destruction of foreign freight cars in the carrier's revenue service?

A. To account 31, "Freight, express and mail cars."

Q. (*A*-579). A carrier has installed coasting clocks—devices attached to cars for registering operation without power. What accounts should be charged with maintenance costs, supplies for operations and pay of clerks recording the results?

A. The cost of repairs and renewals is chargeable to account 33, "Electric equipment of cars"; the cost of motormen's keys to account 67, "Miscellaneous car service expenses"; and the cost of tape and ribbons for clock records to account 94, "Stationery and printing." Pay of clerks engaged on clock records, if employed in the general office, is chargeable to account 84, "Salaries and expenses of general office clerks," or to account 63, "Superintendence of transportation," if employed in other offices.

Q. (*A*-580). What disposition should be made of loss in connection with the retirement of property the cost of which is classable in accounts 536, "Shop equipment," 537, "Furniture," and 538, "Miscellaneous equipment?"

A. These accounts are grouped under general account II, "Equipment," and the retirement of property charged thereto shall be in accordance with the rules prescribed for the retirement of property chargeable to accounts 530 to 535, inclusive, as shown at the top of page 102 of the Uniform System of Accounts. The difference between the original cost of equipment and the salvage recovered shall be prorated on the basis of the life in service prior and subsequent to July 1, 1914, and the difference between the amount thus determined to be applicable to the period prior to July 1, 1914, and the amount of depreciation for such prior period for which accounting has been made, shall be adjusted through profit and loss account 315, "Loss on road and equipment retired." The difference between the amount determined to be applicable to the period subsequent to July 1, 1914, and the amount of depreciation which had been accrued for such period shall be adjusted through operating expense account 41, "Equipment retired."

Q. (*A*-583). A carrier purchases the power it uses and incidentally sells small quantities of the current purchased. To what account should the amount received from the sale of current be credited?

A. To revenue account 118, "Power."

Q. (*A*-584). To what account should be charged war taxes paid on transportation charges for material and supplies?

A. War taxes, when assumed as such, on express charges or on foreign line freight charges on company material shall be charged to account 215, "Taxes assignable to railway operations," except that these taxes when in connection with road and equipment projects, if assignable, shall be charged to account 549, "Taxes," in accordance with Note C to account 215. (See Cases 589 and 598 (a).)

Q. (*A*-586). What accounts should be charged with a bonus paid to all employees?

A. The amount of such bonuses shall be included in the same accounts as the wages or salaries of the employees to whom the bonuses are paid.

Q. (*A*-587). To what account should be charged the cost of compiling lists of employees subject to income tax, to be rendered to the Federal government?

A. The pay of clerks engaged on the work is chargeable to account 84, "Salaries and expenses of general office clerks." The cost of stationary supplies used is chargeable to account 94, "Stationery and printing." (See Case 80, Accounting Bulletin 14.)

$650,000 for Needed Improvements

Directors of the Cincinnati (Ohio) Street Railway have approved the plan to lend their credit to the extent of $650,000 to the Cincinnati (Ohio) Traction Company to enable the latter company, which leases the Cincinnati Street Railway, to make needed improvements.

The Cincinnati Street Railway has increased its directorate by electing Judge Rufus E. Smith and Charles F. Windisch members of the board. This makes a total of eight on the board. Samuel Assur was elected second vice-president, while Bayard Kilgour remains as president. Looking toward the early solution of the traction problem a committee composed of Judge Smith, C. W. Dupuis and Robert A. Taft, all members of the board of directors, was named to make special investigation of the traction situation.

This committee with the addition of the new members of the board and the appointment of Mr. Assur as vice-president are in line with the new policy to take an active interest in the developments of the railway situation in Cincinnati.

$15,500,000 Increase in Authorized Stock at Milwaukee

Holders of more than two-thirds of the outstanding stock of the Milwaukee Electric Railway & Light Company voted on May 25 to amend the articles of incorporation to provide for an increase of $15,500,000 in the company's authorized capital stock and to increase the number of directors from nine to twelve. The dividends on the $4,500,000 of 6 per cent non-cumulative preferred stock now outstanding will be cumulative from and after Jan. 31, 1921.

The authorized stock as increased will consist of $4,500,000 of 6 per cent preferred stock, $15,500,000 of preferred stock, issue of 1921, and $20,000,000 of common stock. There has previously been outstanding $4,500,000 of 6 per cent preferred stock and $9,850,000 of common stock. The new preferred stock will be cumulative at not more than 8 per cent and redeemable at not less than par nor more than 110 as fixed by the directors. It will share ratably with the present preferred stock in the rights to cumulative dividends and in the preference over the common stock in liquidation, but will be non-voting except in the event of default of dividends, differing in that respect from the existing 6 per cent preferred stock, which now has and will retain full voting rights.

Additional financing is proposed through the issue of new preferred stock. It is planned to sell $3,000,000 of the new preferred stock, issue of 1921, bearing dividends at 8 per cent and redeemable at $103 per share, to enable the company to obtain funds to retire floating debt incurred for extensions and to permit the company to invest in additional facilities required to furnish the necessary service in various communities.

At a subsequent meeting held on May 28 the following were added to the board: S. B. Way, vice-president and general manager of the company; Edwin Gruhl, vice-president of the company and of the North American Company, and F. L. Dame, New York.

City's Attitude Governs Reorganization Prospects

The annual report of the Philadelphia Company for the year ended Dec. 31, 1920, makes the following comments on the Pittsburgh situation:

> The Pittsburgh Railways remained in the hands of the courts and receivers throughout the year. They made considerable progress in rehabilitating tracks and equipment from earnings, but failed to pay all fixed charges that accrued, and the Philadelphia company was called upon to pay interest due on some of the guaranteed bonds.
>
> The petition of the Philadelphia Company to have returned to its treasury $495,000 which had been advanced the previous year for bond interest is still in the hands of the court. The same condition prevails as to some of the claims of the city of Pittsburgh.
>
> The receivers have clearly demonstrated that some form of financing for new money with which to rehabilitate the property must take place before any marked improvement can be shown in the betterment of the property and the service to the public, as sufficient money for this purpose cannot accrue through earnings. The receivers also report the necessity for immediately adding 150 new cars to the equipment. More than five years have now passed since any new cars were placed in service.

It is recited that some progress has been made toward reorganization, but the opinion is expressed that before a successful reorganization of the properties can take place a definite attitude toward the railway will have to be assumed by the city officials and officers of the municipalities served. This is necessary in order to establish a transportation system which will give adequate service to the public. Because of the physical condition of the properties the problem of successful rehabilitation is a difficult one.

Merger Differences Irreconcilable

Despite the fact that at one time the prospects appeared to be bright for reaching a basis of understanding upon which the Washington Railway & Electric Company and the Capitol Traction Company might be induced voluntarily to merge, all hope of such merger at this time appears now to have vanished. In fact the local Public Utilities Commission, before which possible details were discussed, has issued a statement to the effect that the differences between the companies "are so great as to be irreconcilable."

It is said now that the only remaining possibility for a union of the two railways rests with the committees of Congress. Even this, however, appears very remote, for the Washington *Post*, which has been following the negotiations at much length in its columns, says that "even there the drafting of legislation on the subject probably will prove as difficult a job as that faced by the commissioners in attempting to get the companies to unite voluntarily."

Interurban Saved from the Scrap Heap

Application has been made to the Public Service Commission by the reorganized Buffalo & Depew Railway, Buffalo, N. Y., for permission to operate the interurban line between Genesee Street at the city line of Buffalo to Cheektowaga, Depew and Lancaster. The new company which has taken over the line from the receiver is the Depew & Lancaster Railway Corporation. It is capitalized at $200,000. The purchase price was $6,250 plus taxes due to various towns and villages, aggregating about $40,000.

Action on the petition has been deferred temporarily. The commission's experts will first report their findings in an examination of the physical properties and approval also must be given for the sale of the line.

John J. Lenahan & Son, 53-61 Fulton Street, Buffalo, bid in the property. Instead of junking the road as was the original intention, Mr. Lenahan and his associates will rehabilitate the line and operate it in competition with the International Railway-Buffalo-Depew-Lancaster division.

It is reported the villages and towns along the line have agreed to waive the back taxes in return for an agreement from the new company to operate the railway for a period of at least three years.

Interstate Road Sold at Foreclosure

The property of the Northampton Traction Company, running between Easton, Pa., and Phillipsburg, N. J., has been sold for $430,000 to C. S. Newhall, Philadelphia, chairman of the bondholders' protective committee. Mr. Newhall also purchased the right, title and interest of the company in $100,000 of second mortgage bonds; $44,000 of first mortgage bonds; $81,500 of third mortgage bonds, all of which were deposited by the Northampton Traction Company as collateral security under a mortgage given by the Northampton, Easton & Washington Traction Company to the Bankers' Trust Company, New York, as trustee; $130,000 of second mortgage bonds of the Bangor & Portland Traction Company deposited as collateral security under agreement made with the Easton (Pa.) Trust Company, as trustee; $23,000 of bonds issued by the company under a fourth mortgage and pledged as collateral for the payment of certain loans due various banks; 2,600 shares of the capital stock of the Bangor & Portland Traction Company and 10,793 shares of the Northampton, Easton & Washington Traction Company.

Interurban Sold Under Foreclosure.—The Philadelphia & Eastern Electric Railway, operating between Doylestown and Easton, Pa., has been sold under the hammer for $200,000 to John E. Snyder, Lancaster, Pa., representing the bondholders. The line is approximately 34 miles long.

Commission Checking New Jersey Valuation Figures

The Board of Public Utility Commissions of New Jersey is now engaged in going over with its engineers records and other data used as a basis by Ford, Bacon & Davis in reaching their findings with respect to the valuation of the property of the Public Service Railway and the Trenton & Mercer County Traction Corporation. The board had previously ruled that without information of this kind it could not provide an opportunity for cross-examination on the appraisal.

The valuation by Ford, Bacon & Davis, made at an expense of $100,000 to the State, was started under a special legislative act which provided that the findings of the engineers selected by the special valuation commission which the act created should be accepted by the Public Service Commission without review as a basis for fixing rates. While the valuation was in progress, however, the act was amended by the new legislature to require the acceptance of the valuation by the Utility Commissioners only as presumptive evidence.

In consequence of this change the utility commissioners at recent public hearings called upon the engineers for the original documents upon which they based their findings as to values. At these hearings it was brought out that among other information upon which the engineers had drawn for their guidance was the appraisal of the Public Service Railway as made for that company by Dean Mortimer N. Cooley. Other hearings will be held after the engineers for the commission have had an opportunity to check unit figures used by the valuation engineers with those found by the engineers of the commission for certain property accounts.

Financial News Notes

Rails Will Be Taken Up.—The Fresno (Cal.) Interurban Railway is planning to dismantle its line. Automobile competition has made the operation of the electric railway practically impossible.

Receiver for Subsidiary.—Patrick A. Barry, Mt. Vernon, Ohio, has been appointed receiver of the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, controlled by the Ohio Electric Railway, already in the hands of receivers. The appointment was made on the application of the Girard Trust Company, Philadelphia, which charges default of the railway in the payment of interest on $1,211,000 of twenty-year bonds issued in 1906. The trust company asks that the mortgage be foreclosed, the railway property sold and proceeds applied to the payment of the bonds.

Texas Property Sold.—The property of the Corpus Christi Railway & Light Company, Corpus Christi, Tex., was sold at public auction on May 27 by R. U. Culberson, receiver. The railway and the lighting plant were first offered jointly, but as there were no bidders the auctioneer separated the two and offered the railway first. This was purchased by Claud Pollard, Houston, acting in his own behalf, on a bid of $500. Mr. Pollard said the purchase is made preparatory to scrapping the line unless local men are willing to raise money to guarantee operation without loss or will lease the line and operate it themselves.

Railway Property to Be Sold.—The property of the United Traction & Electric Company, Providence, R. I., will be sold under a decree of foreclosure in Providence on June 24. It is believed that the property will be bought in for the United States Electric Railways, the successor company. This latter company recently petitioned the Public Utilities Commission for permission to issue about $21,000,000 in stocks and bonds. The commission will consider the proposition at a public hearing on June 14.

Power Plant Sold to Light Company.—Following approval of the Railroad Commission of California the San Diego Consolidated Gas & Electric Company has issued and sold to H. M. Byllesby & Company, Harris Trust & Savings Bank, and Blyth, Witter & Company an issue of $2,750,000 of first and refunding mortgage 6 per cent gold bonds, due March 1, 1939. Proceeds of the issue will provide needed improvements and extensions to the company's present gas and electric generating equipment, transmission and service facilities. A part of the improvement program provides for the purchase of the power house of the San Diego Electric Railway with 8,200 kw. of installed capacity and for the enlargement and improvement of this station.

Accumulated Deficit $163,688.—The gross revenue of the Memphis (Tenn.) Street Railway in April, 1921, was only $266,729, as compared with $271,156 in April, 1920, when the company was operating on a 6-cent fare. The number of revenue passengers decreased from 4,484,919 to 3,836,639. Although the wage scale now in effect is much higher than that in force a year ago, L. LeMay, secretary-treasurer of the company, says that the operating expense during the month just ended was only slightly in excess of that of April, 1920. The cost of coal and other supplies and equipment is much lower than during the same period last year. The April deficit was $8,067. This brings the total deficit in the fare index fund from July, 1920, to May 1, 1921, to $163,688.

Additional Issue Authorized. — The Transit Commission of New York recently issued an order permitting Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to issue an additional $3,000,000 in receiver's certificates. An extension of time was also allowed on $15,000,000 receiver's certificates from Aug. 1 to Feb. 1 next. Judge Mayer in the United States District Court signed the decree for maturity extension and in his decison reviewed the improvements undertaken by the company through the aid of receiver's certificates. Since August, 1919, he pointed out that 300 subway cars had been built, the reconstruction work on the Brighton Line between Church Avenue and Malbone Street had been completed and various terminals and power houses have been finished.

City Buys Trolley Liens.—New York City, through the Collector of Assessments and Arrears, recently bought at public sale franchise-tax liens on nineteen lines of the New York Railways and the Third Avenue Railway with a face value of $1,628.508. The railways still have three years to redeem the franchise by tax payments with interest. Protests were made against the sale. Among them was one from Job E. Hedges, receiver of the New York Railways, who contended that the taxes demanded exceeded those justly due. What disposition the city will make of the liens has not been disclosed.

Columbus Bonds Offered. — Stockholders of the Columbus Railway, Power & Light Company, Columbus, Ohio, have authorized the issuance of $2,700,000 in 5 per cent first refunding and extension bonds for the purpose of retiring a similar amount of general mortgage bonds bearing 6 per cent interest, issued in June, 1920. At that time, also, the company was authorized to issue $2,500,000 in refunding and extension bonds, which with the new issue brings the total of such bonds to $5,200,000. The new issue had been authorized by the State Public Utilities Commission a few days before. The stockholders voted to accept the offer of Harris, Forbes & Company, New York, N. Y. The bonds have since been offered for subscription.

$4,180,000 of Acquisition Bonds Authorized.—On May 24 the Western Pacific Railroad was authorized by the Interstate Commerce Commission to issue and sell at not less than 85 per cent of par $4,180,000 of first mortgage gold bonds to acquire the Sacramento Northern Railroad, an interurban electric railway in the vicinity of Sacramento, Cal. The Western Pacific also proposes in event of acquisition to construct certain extensions to the property at an estimated cost of $3,000,000, and is expected to apply to the commission within sixty days for authority to issue $3,000,000 of its first mortgage bonds for that purpose. Although authority was granted for issuance of the bonds for the declared purpose of acquiring the properties the commission made clear it had not finally passed on the question of acquisition. "The merits of such acquisition are not now in issue," the announcement said, "and we express no opinion on that question." A further hearing is to be held.

Traffic and Transportation

Readjustment in Dubuque—Lower Fares, Lower Wages

In view of the great reduction in patronage during the last six months on the lines of the Dubuque (Ia.) Electric Company, the management has found it necessary to cut the wages of its employees as the only possible way of reducing operating expenses. On May 4 the following modifications in rates of pay in cents per hour went into effect in the platform wage scale:

	New	Old
First six months	35	38
Next six months	38	44
Second year	41	50
Third year and thereafter	45	60

A copy of the bulletin listing the changes was posted at the carhouse and was also given to each employee individually. The day previous to the posting of the bulletin the notice was submitted to the Mayor, the City Manager and Aldermen, at whose instance a lower ticket rate was placed in effect for a trial period as another readjustment measure. The rate was changed from seven tickets for 50 cents to four tickets for 25 cents—the cash fare of 8 cents remaining the same.

In its statement the company said that it was unfortunate that the great bulk of the expense carried was represented by wages and that any material reduction in expenses could not be accomplished without a reduction in wages. Moreover, the company contended that it was extremely questionable whether revenues would be proportionately increased if the fare were higher, because riding, already at a low ebb, might be still further discouraged.

Reduced Fare Authorized—Rerouting Plans Under Way

The Indiana Public Service Commission has formally issued the order authorizing the Indianapolis (Ind.) Street Railway to return to the straight 5-cent fare with a 2-cent transfer. The likelihood of this ruling was referred to in the ELECTRIC RAILWAY JOURNAL for June 4. The new fare takes the place of a 6-cent cash fare, twenty tickets for $1, together with a 1-cent transfer. The lower fares will be tried out in the hope of reducing jitney bus competition, which has greatly affected the receipts of the railway.

Rerouting the line of the railway, which was one of the conditions upon which the Public Service Commission ordered a return to the 5-cent fare, will be effected gradually one line at a time. David E. Matthews, chief railroad inspector of the commission, has been placed in charge of the rerouting. He will meet with the City Council soon to consider the first change in routes. The rerouting is to be done in an effort to enable the company to check the inroads of the jitney bus. During the period until Aug. 1, while the rerouting plans are being worked out, the 5-cent fare and 2-cent transfer charge will be effective.

Officials of the railway have indicated that they will co-operate to the fullest extent with state and city officials in revising the routes to improve service. In addition to the rerouting of cars the commission will take up the question of the improvement of service during rush hours. In working out the rerouting plans the commission experts probably will consult with officials in other cities. It may even be found advisable, it is said, to call in engineers familiar with such problems to advise on the matters that arise.

Connecticut Roads Authorized to Run Buses

The Governor of Connecticut has affixed his signature to a bill authorizing electric railways to own and operate motor vehicles for hire. The text of the measure follows:

> *Sec.* 1. Any street railway company may acquire, own and operate motor vehicles running upon a regular route and carrying passengers between the termini or over any intermediate portion of such route at a regular stipulated individual or per capita fare. Any company which shall exercise the authority conferred by the provisions of this act shall be subject to the supervision and control of the Public Utilities Commission to the same extent and in the same manner as with respect to the business of transporting passengers and property by means of street railway cars.
>
> *Sec. 2.* This act shall take effect from its passage.

J. Moss Ives, receiver for the Danbury & Bethel Street Railway, announced in the Superior Court at Bridgeport on June 3 that his company would take advantage of the new law and try out the feasibility of operating buses in place of trolleys over portions of lines which have proved unprofitable.

City of New Orleans Asks for Further Evidence

The Commission Council of New Orleans, La., has made answer to Receiver O'Keefe of the New Orleans Railway & Light Company, in the injunction suit restraining the city from interfering with him in the collection of an 8-cent fare. It is alleged by the city that no proof has been tendered by the receiver that subsidiary corporations of the railways are bound by agreements under the parent concern and in the alternative the court is asked to compel the receiver to produce all contracts, agreements and leases between the railway and the subsidiaries. It is further alleged that the company has not been operated efficiently and economically.

Jitney Regulation Bill Vetoed in Wisconsin

Governor John J. Blaine of Wisconsin has vetoed the so-called Perry jitney bill. This measure would have placed all motor buses and jitneys operating in the state under the jurisdiction of the Wisconsin Railroad Commission and would, as it is claimed, have virtually put the motor bus lines in the state out of business. In his message explaining the veto Governor Blaine stated that his objection to the bill was that it undertook to regulate in a field "where free competition serves the public welfare best."

The Governor pointed out that the law as it now stands requires motor vehicles to furnish adequate service at reasonable rates. He is reported in part as follows:

> My objection to this bill is fundamental. Jitneys and buses may be operated by anyone, and, therefore, there is no opportunity to create a monopoly. It is quite different with respect to a street railway, an interurban railway, or a railroad. There is a limitation on the number of such roads that may occupy the field for transportation.
>
> Wisconsin has spent $42,000,000 on highways in the last ten years, and the people were led to believe that they would receive returns from such investment in better transportation, greater convenience, and in economy of service. The motor vehicles have come to stay; they are the beginning of a transportation system about which it is dangerous to prophesy. My objection, therefore, to this bill is that it undertakes to regulate in a field where free competition serves the public welfare best.

Mayor Seeks Reduction of Fares in Detroit

Action has been started by Mayor Couzens of Detroit, Mich., with a view to bringing about a reduction of fare on the city lines of the Detroit United Railway and having the company cash the rebate slips issued with tickets purchased during the past year. In a letter addressed to Allen F. Edwards, acting president of the Detroit United Railway, the Mayor asks that a conference be arranged for an early date to consider the matter of reducing the fare to 5 cents. Another letter was addressed by the Mayor to the Corporation Counsel asking him to arrange a conference with the company's attorneys regarding the refund of money by the company.

The basis for his action, according to the Mayor, is the fact that the audit of the company's books for the city indicates that the increased revenue resulting from the increase in fares from 5 cents to 6 cents cash, or nine tickets for 50 cents, has exceeded by more than $507,523 the amount used to offset the increase in wages granted to the railway employees.

In the letter to Mr. Edwards the Mayor cites the fact that practically a year has elapsed since the company was granted an increase in rate for the purpose of paying increased wages to the platform men and he states that in view of the fact that on May 1 the wages were reduced to the point where they were prior to last June, consideration should be given to the matter of reducing fares to the rate existing prior to June 9, 1920.

Six Cents in Los Angeles

Return of 7.4 Per Cent Allowed on Rate Base of $26,198,365—Zone Fare Opposed

Under the order of the Railroad Commission of California issued on June 1 the 5-cent fare is continued for Los Angeles. The "nickel" fare, however, is not for the casual rider. It is only for purchasers of ten rides. As indicated in the ELECTRIC RAILWAY JOURNAL for June 4, page 1058, the fare on the Los Angeles Railway will be 6 cents for those who do not buy "tokens" or tickets. Tokens or tickets are transferable. They are to be sold on the cars and at the company's offices.

$2,600,000 FOR BETTERMENTS

The service improvements contemplated by the commission require the purchase by the company of 132 additional cars to cost $1,400,000, construction of additional carhouses, shops and substations, and the making of other improvements to cost $2,600,000.

The company is ordered to establish a depreciation fund and $720,000 a year in monthly installments of $60,000 and is asked to enter into negotiations with the city of Los Angeles for the purpose of exchanging, on reasonable terms, its present limited franchises for an indeterminate re-settlement franchise covering all of the lines in operation within the city limits.

The order requires that monthly statements must be submitted by the company to the commission to show how the order of the commission has been carried out.

In discussing the zone system the commission said:

> It is apparent that there is a very widespread opposition to zone fares within the present 5-cent fare limits, and it is also true that there would be serious difficulties in fare collection if a zone system were adopted. In view of the conditions existing in Los Angeles, we are inclined to believe that zoning of the city should not be undertaken without further careful study and only as a last and inevitable remedy.

As to imposing a charge for transfers the commission said:

> We are satisfied such a charge would result in an unjustifiable discrimination between different users of the street railway and the discrimination would be particularly obnoxious under the peculiar conditions obtaining in Los Angeles, where a large percentage of transfer passengers are short-haul riders. There would also result from a transfer charge a discrimination between various business localities in the downtown district.

DECLINING COSTS A FACTOR

The commission declares that it is apparent that the company is not entitled to the full amount of additional revenue that would be produced by a flat increase to a 6-cent fare and that no burden should be placed on patrons unless entirely necessary and justified.

The company is allowed a return of 7.4 per cent on a rate base of $26,198,365. On this the commission said:

> In a time of declining costs and prices (having in mind the unavoidable uncertainties in estimates of this nature) it may confidently be expected that applicant will earn, under the rates suggested, and under economical and efficient management a full measure of the contemplated fair return. With the income from the rates fixed in this decision, the applicant will be in a position, we believe, to secure the necessary capital for new equipment, betterments, and extensions, and the commission will expect the betterment program be carried out.

Change in Ticket Rate.—Reductions of the ticket fare between Broad Ripple and Indianapolis was decided on by the Indiana Public Service Commission at a conference on May 4. The present rate for tickets is six for 50 cents. Under the new order ten tickets will be sold for 75 cents. The reduction in the ticket fare is slightly less than 1 cent on each ticket. Under the old rate one ticket cost 8⅓ cents, and under the new order the cost of one ticket will be 7½ cents. The cash fare of 10 cents between Broad Ripple and Indianapolis, with a 5-cent fare from Fifty-third Street, will remain unchanged under the modified order which will be issued by the commission. Notice of the change in ticket rates will be given to the public when the order is issued, officials of the commission said. The order establishing the present fares was approved by the commission on Dec. 17.

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170 Applications for Bus Permits

Hearings Being Held Before Connecticut Public Service Commission to Fix Status of Bus

A new campaign for supremacy between Connecticut electric railways and jitney buses has begun with the series of hearings before the Public Utilities Commission on the petitions of bus line owners, rural and interurban, for the most part, for license to operate in competition with the electric railways. The commission has received 170 applications for such certificates from various parts of the State. Its power of regulation in this matter was conferred upon it in a law passed by the present Legislature. The issue has become clearly defined and urgent as is indicated in the statement of Lucius S. Storrs, president of the Connecticut Company, while at Putnam that "either the competitive bus service must be entirely eliminated or the trolley service discontinued."

IN ADDITION to the hearing at Putnam on May 25, sessions were held at Hartford on May 24 and at New Britain on May 27. Other hearings were scheduled as follows: Middletown on June 2 on petitions concerning bus lines between Essex and Middletown, Saybrook-Middletown and Ivoryton-Middletown; at Enfield on June 2, Thompsonville-Agawam, Mass.; at New Haven on June 2. Derby-New Haven (four lines), Derby-Ansonia (two lines); at Hartford on June 1, Waterbury-Hartford.

Richard T. Higgins and Charles C. Elwell of the commission conducted the hearing at Putnam, attended by some 150 persons. President Storrs read a statement in part as follows:

> The Connecticut Company is amply able, to render a full measure of service to these communities, but it must be apparent to all that all public expenditures for transportation must come to the Connecticut Company.
>
> Up to the present time we have been temporizing with the matter, but now that the bus is a medium of transportation upon which the communities can depend as long as those individuals that operate the buses are financially able to continue, or do not become tired of the work, it is time for the Connecticut Company frankly to state its position.
>
> It is a matter of indifference to us as to whether or not we continue to operate the lines between Central Village and points north to Putnam, but the competitive bus service must be eliminated or the trolley service discontinued.
>
> There is no prospect of material profits to the railway even though it is left alone in the field but the company recognizes the obligation to perform public service and is willing again to render a full measure of service if free from competition.

Eight witnesses testified as to the indispensability of the buses. General J. W. Atwood, L. H. Fuller of the local chamber of commerce and other citizens spoke in favor of the trolleys.

Thomas J. McGreevy, assistant comptroller of the Connecticut Company, said that on the lines north of Central Village the operating expenses exceeded the receipts by $37,206 for the year ended April 30, 1921.

At the hearing in Hartford Mayor Newton C. Brainard said that the presence of large buses on the city streets was most objectionable. Consideration was being given a petition for the continuance of a jitney line between the Capital and South Manchester over a route served by the electric railway. There were prominent citizens present who said there was need of both trolley and jitney service and others were unqualifiedly in favor either of one or the other. Competition over the Manchester-Hartford line has been of the keenest.

Nathaniel J. Scott, manager of the Connecticut Company's Hartford division, presented a chart to show what service the company had been rendering prior to August, 1920, and at the present time. The reduction in service, he explained, had been due to the decrease in the number of passengers. A count of passengers on Hartford-bound cars recently showed a maximum of twenty-three and a minimum of three. The seating capacity is fifty-six.

"Trolley cars are essential but they can't accommodate the public," declared Mayor Curtis of New Britain at the hearing in that city. He said that the Connecticut Company had not furnished additional service as the demand for it arose at times in the past when there was no jitney competition. It was his opinion that the company would derive larger profits on a lower rate of fare.

In New Britain the buses are run over routes within the city in direct competition with the electric railway.

The Hartford case concerns only entrance to the city as a terminus to an interurban line.

The Aldermen of Bridgeport have gone on record as believing that the jitney buses are a public necessity and convenience in many parts of Bridgeport and that the present routes for jitney buses should be maintained. Suggestions for jitney bus regulations in Bridgeport also were outlined in a report adopted by the Aldermen.

WORK DIVIDED BY COMMISSION

Because of the large number of applications for certificates to operate jitney buses in the State, the Connecticut Public Utilities Commission has found it necessary to divide the work. During the past week Commissioner R. T. Higgins has conducted hearings in Thompsonville, C. C. Elwell in New Haven and J. W. Alsop in Middletown.

Before the entire commission on June 1 at the state Capitol petitions were considered from persons desiring to operate buses between Hartford and New Britain and Hartford and Waterbury. Residents of towns lying between these cities said that they saw no advantage in having the jitney service.

The New York, New Haven & Hartford Railroad objected to the issuing of the certificates because the jitney men in Hartford and Waterbury made their headquarters near the railway stations and thus diverted passengers away from the railroad. He also said that the railroad was running eight trains daily between the two cities and thus was furnishing adequate service. The fare on the railroad is $1.21. The buses charge $1.25.

The commission endeavored at a hearing in New Haven on June 2 to determine the present condition of the traffic over the various bus lines radiating from that city, more particularly the New Haven-Derby route. There are about forty cars operating on the line at present, thirteen large buses and twenty-seven touring cars. The buses run every half hour and the touring cars every ten minutes. The trolleys maintain a half hour schedule for a greater part of the day.

It was estimated that each bus earns about $7,000 a year, which with a fare of 20 cents means a passenger traffic of approximately 35,000 persons a bus a year.

$7,000 A YEAR EARNED PER BUS

The New Haven-Derby Bus Corporation was incorporated a few weeks ago with a capital stock of $50,000 by nine bus owners who intend to operate ten large buses having a seating capacity of from twelve to sixteen. According to the plans of the incorporators, beginning July 15 buses will run every half hour from 6 a.m. to 12:30 p.m., every 15 minutes from 12:30 to 6 p.m. and every half hour from 6 p.m. to 12 p.m. The time between New Haven and Derby is about 25 minutes.

The owners of the touring cars operated between the cities were represented by P. J. O'Sullivan, Derby. They have already planned an association and operate about twice as many cars as the bus corporation. The touring car fare is 25 cents, or 5 cents less than on the trolley.

Attorney George D. Watrous, general counsel for the Connecticut Company, questioned all the witnesses to show that the trolley can easily accommodate all the traffic. It was found on May 31 that from Derby to New Haven beginning at 5 a.m. and ending at 11 p.m. the trolleys carried 741 and the jitneys 601 passengers. Outbound from New Haven for the same period the trolleys totalled 865 and the buses 703, showing that out of a total of 2,910 passengers the buses carried 1,304, or nearly 45 per cent. Attorney Robert J. Woodruff, in behalf of the buses, brought up the question of the increases in fare which have been made by the trolley. It was finally agreed by representatives of both the trolley and the buses to furnish financial statements for those particular lines during definite similar periods.

COMMISSION RESERVES DECISION

Commissioner Elwell, together with Mr. Wadhams and Mr. Rudd, heard the testimony. Mr. Elwell examined each of the witnesses.

On June 7 in New Haven the commission heard evidence with respect to bus service between New Haven and Wallingford.

Seventeen per Cent Wage Reduction in Youngstown

A new wage agreement has been entered into between the trainmen and the Pennsylvania-Ohio Electric Company, the Youngstown Municipal Railway and associated companies operating city and interurban lines at Youngstown, Warren and Niles, Ohio, and New Castle and Sharon, Pa. The new scale is 48 cents an hour for the first three months of employment, 51 cents an hour for the next nine months and 56 cents an hour after one year, with 5 cents additional on all classifications for operators of one-man safety cars.

This is a reduction of 12 cents an hour in each classification and of 17.6 per cent on the base rate. The old scale was 60 cents an hour for the first three months of employment, 63 cents an hour for the next nine months and 68 cents an hour after one year, with the 5-cent differential for operators of safety cars.

The old scale expired at midnight on May 31, at which time no agreement had been reached. Operations and negotiations continued and the agreement was reached on June 2 and was ratified by the trainmen by a vote of 348 to 106, about 85 per cent of the men voting. The new agreement continues in force till June 1, 1922. It provides for minor changes in working conditions and removes restrictions on the use of one-man safety cars.

On June 4 a new agreement also was reached by the same companies with their linemen, who had been on strike since May 1. The new wage scale for these men is on the same percentage of reduction as that of the trainmen. The old scale had been on the base rate of $1 an hour. This was reduced to 82½ cents an hour. The linemen had demanded the renewal of the old rate.

Kansas City Residents Hard to Pacify

Weekly adjustment of jitney routes by the city jitney inspector has become necessary at Kansas City, Mo., to meet objections from property owners and the constantly decreasing number of streets available for jitney use is raising a serious situation with respect to routing. It is not always possible to select a route on which jitney operation might be profitable. Citizens have prepared petitions to the Mayor, asking that jitneys be routed away from their streets; and in many cases the Mayor has responded to the petitions by ordering the routes changed. In some instances the City Council has passed ordinances requiring the changing of jitney routes.

In other cases routes have been shortened so that now they are short-haul and jitneys on such routes are finding competition with the railway difficult at the 10-cent rate. In consequence there is a prospect that jitney tickets on such routes may be sold at two for 15 cents.

The chief harassment of city officials is from home owners who point to the hazards to children of jitney operation on residence streets. Downtown the difficulty has not yet been adequately met of so routing jitneys as to avoid serious congestion of normal traffic in busy hours.

Jitneys were recently by ordinance ruled off streets on which the Kansas City Railway operates.

Would Make Operating Ordinance More Explicit

Objection on the ground that it is not sufficiently explicit was made by Mayor John Galvin of Cincinnati to an ordinance submitted by the Cincinnati (Ohio) Traction Company, providing for a decrease in fares. The principal provisions of the ordinance, which was submitted as an amendment to the present ordinance, are as follows:

> That school children ten years old and over shall pay 5-cent fare.
>
> That those less than ten years shall ride as minors on half fare.
>
> That payment of the Cincinnati Street Railway franchise tax of $350,000 a year be deferred for 1920 and 1921 until after Jan. 1, 1922.

The proposed ordinance also provided that when fares exceed 7½ cents the company be not required to make any payment into its reserve fund. Under the present ordinance the reserve fund must reach $650,000 before fares can be reduced.

The city officials, after considering the ordinance, asked that it be redrawn to make it more explicit, particularly as to when fares will be reduced.

Bus Men Determined to Fight

A hearing was scheduled for June 7 in the Common Pleas Court at Toledo, Ohio, on the petition for a permanent injunction restraining the city from enforcing the bus regulatory ordinance, which was to have gone into effect on June 1. The court recently granted a temporary restraining order which permitted the buses to operate during the week. The city attorneys claim that the municipality has still the right to regulate any kind of traffic and that the buses do not own any privilege of the streets.

At a recent meeting of fifty-five bus owners and operators the bus men said they would not take out licenses and provide indemnity bonds but would stand arrest and prosecution.

Commissioner W. E. Cann, when the measure was proposed in Council, pointed out that the Community Traction Company pays approximately $300 a car annually in taxes, street cleaning, snow sweeping, pavement repairs, and other ways, for the privilege of operating. Buses, heretofore, have been charged a license fee of $1 merely for police regulation.

Stage Rules Laid Down

At the hearing held at Olympia, Wash., recently on the tentative set of rules and regulations laid down by the auto transportation section of the Department of Public Works, a number of new provisions was set down for the regulation of stage and auto freight lines. The most important ruling made was the announcement that the department would hold that taxi and jitney companies could not carry passengers over lines for which certificates of convenience and necessity had been issued to stage companies. Representatives of the Seattle Taxi Company immediately announced that this was undoubtedly a point to be settled in court.

Considerable objection was raised to one clause in the rule regarding the use of emergency cars, and this brought out the fact that no car will be allowed to operate on any of the stage lines of the State unless they protect passengers by the bonding of the car with a surety company. This provision will also apply to emergency cars. At first the ruling was so drawn that before an emergency car could be placed on a run, it would be necessary to telegraph the department at Olympia and get permission of the head of the stage department there. This, however, was amended so that a record will be kept of the use of emergency cars, and a fee charged therefor, but only bonded cars will be used.

Ten hours of driving was decided upon as the maximum length of time in which a stage driver should work in any twenty-four hours, and eight hours of consecutive sleep was determined on as necessary in every twenty-four hours to keep him fit properly to protect the public. The new rules became effective on June 1.

Transportation News Notes

Seven Cents in Sioux City. — The Sioux City (Ia.) Service Company was recently granted permission to charge a 7-cent fare under a temporary injunction which restrains the city from enforcing the ordinance providing for a 6-cent fare. Refund certificates good for 1 cent each are being issued in case final judgment is against a 7-cent fare. The City Council recently stated its unwillingness to countenance any wage cut affecting employees. The company accordingly brought court action.

Fare Suit Dismissed. — The suit of Reuben Ruthenberg, attorney, to enjoin the Louisville (Ky.) Railway from collecting more than 5 cents was dismissed by Judge Kirby recently because the same questions involved in Attorney Ruthenberg's suit are pending in the United States Circuit Court of Appeals. It was Attorney Ruthenberg's plea that he acted in the capacity of a private citizen, while in the other suit the municipality was concerned. Judge Kirby indicated that it was the rule in Kentucky that the court taking first jurisdiction in a case should carry it to a conclusion.

Fare Rate Excessive. — Examiner Witters recently filed a report with the Interstate Commerce Commission maintaining that the 10-cent fare charged by the Louisville & Northern Railway & Lighting Company, New Albany, Ind., was unreasonable. The line runs between Louisville and New Albany and up to Oct. 31, 1920, operated on a 7-cent fare. Shortly after the inception of the 10-cent rate the city of New Albany, the Chamber of Commerce and several associations filed a protest with the Interstate Commerce Commission asking for a hearing. This hearing took place on Feb. 17 of this year before Mr. Witters.

Rehearing in Fares Refused.—The Board of City Commissioners of Dallas, Tex., has refused the application of the Dallas Railway for a rehearing of its petition for authority to increase fares from 6 cents to 7 cents in Dallas. The refusal to grant the 7-cent fare was based on a report by J. W. Everman, supervisor of public utilities, in which it was shown that the earnings of the Dallas Railway during April showed a net return of 7.275 per cent on its invested capital, while the franchise provisions call for a net return of 7 per cent. It is also claimed that, eliminating the earnings of the Dallas Interurban Building, which is 4 per cent, the Dallas Railway would show net earnings of 78.93 per cent during April. The action of the application for rehearing had been delayed because of the death of J. F. Strickland, president of the company. The 6-cent fare granted the company for a period of one year will expire on June 25, and the city commission has made no intimation as to whether this fare will be continued for another year. It is believed, however, that such an extension will be granted. Action on the matter of resort to the Federal court will likely await the election of a successor to Mr. Strickland.

Fare Increase Authorized.—Determining that the Salem & Pennsgrove Traction Company, Pennsgrove, N. J., under its present operating revenue, will not be able to meet the interest on its funded debt or even the taxes which will become due, the Public Utilities Commission has allowed the company to increase from 7 to 8 cents the rate of fare in each of its five zones. The company's line extends from a point in the Borough of Pennsgrove through the townships of Upper Penns Neck and Lower Penns Neck, in Salem County, a distance of 14.25 miles. The company was formed and the road constructed in 1915 entirely with private capital. When it was constructed there was in operation a large industrial plant at Carney's Point for the manufacture of war munitions and the road was required for the transportation of employees. During 1916 and 1917 the road was operated at a profit on a 5-cent fare, but in February of last year the commission permitted the company to charge 7 cents. Since the cessation of the war the industrial plant laid off hundreds of hands and the road lost money. Residents of the communities using the railway favor the continuance of operations and no objection is expected to the increased rate.

Saltair Road Raises Fare.—The Salt Lake, Garfield and Western Railroad, Salt Lake City, Utah, has been granted permission to increase its one-way fare from Saltair beach to Salt Lake City, in a recent decision of the Public Utilities Commission of Utah. The decision grants permission to increase the one-way fares during the Saltair beach resort season from 25 to 35 cents and the one-way half fare excursion from Saltair to Salt Lake from 15 cents to 20 cents. The decision particularly affects motorists who go to the resort by auto and return on the train. When the round trip fare was increased to 35 cents last year a subfare was published providing for a 25-cent excursion fare from the beach to Salt Lake. The decision now makes the one-way fare the same as that charged for the round trip from the city. The company claimed that it had sustained a loss from operating the road between the beach and the city during 1920 which amounted to $37,000. The increase granted, it is estimated, will increase the revenues by $6,000 during this year, but the company will sustain a deficit, according to testimony given before the commission. The increase will be made effective on ten days' notice filed with the commission. The commutation tickets at present are sold in books of thirty for $7.50 and books of 100 for $20.

Personal Mention

Mr. Beall Texas Electric Railway's New Head

Jack Beall was elected president Texas Electric Railway by directors on June 7. Mr. Beall, who has been one of the attorneys for the interurban for six years, is a brother-in-law of the late Col. J. F. Strickland, former head of the railway. N. A. McMillan, St. Louis, was elected chairman of the board of directors, a position which has just been created.

Operators Advanced to Take Charge of New Department

W. R. Alberger, vice-president and general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has announced several important changes in the duties and responsibilities of various members of his official staff.

George H. Harris, for the past seven years general superintendent of the company, has been appointed assistant to the general manager. The position of general superintendent is abolished. A portrait of Mr. Harris and an outline of his career appeared in the JOURNAL for March 19 following his election as president of the Pacific Railway Club.

In line with the company's policy of keeping abreast or even ahead of modern business methods a new department has been created, the duties of which will be to make an intensive study of all costs and results obtained from various methods of maintenance and operation. This department, which is a decided innovation in public utility management, will secure and compile into comprehensive and graphic reports, definite and conclusive data regarding all activities of the company, not only as to costs of different types of constructions and equipment and their maintenance and operation, but also as to revenues derived from all sources. Such information will serve as a guide to the management in its efforts to furnish to the public proper and efficient service.

S. H. Pickard is appointed manager to head this newly created department, while J. W. Brom, for several years a member of the general manager's office staff, will be associated with Mr. Pickard in the new organization.

F. R. Lloyd has been appointed purchasing agent, the position left vacant by Mr. Pickard's promotion. Mr. Lloyd has been assistant purchasing agent since 1914, with the exception of two years when he served in the army in France during the recent war.

A department of personnel has also been organized to handle all employment for the company and to supervise all training of employees, as well as all personnel work which may be undertaken. John S. Mills, formerly claim agent and assistant superintendent, is at the head of this work.

New Post for Mr. Weber

Former Power and Equipment Engineer Takes Mr. Grauten's Place on Kansas City Railways

The appointment of R. L. Weber as electrical engineer of the Kansas City Railways, succeeding S. H. Grauten, has been announced by the receivers. Mr. Weber came to the railways company in 1914, as engineer of equipment and power for the Board of Control, the bi-partisan supervisory board created by the new railways' franchise of 1914.

During the war, Mr. Weber served in the cruiser and transport force of the Atlantic fleet with duty on the transports *St. Paul* and *Lenape* and on the cruiser *Albany*. On his relief from service in May, 1919, he resumed his connection with the Board of Control, in Kansas City.

R. L. WEBER

Prior to the war Mr. Weber had directed the design and construction of the last two series of double-truck cars which have established an especially satisfactory record. Since the war, the activities of his department have been centered on power house improvements, and under his direction several effective measures have been carried out.

Mr. Weber's change from engineer of the Board of Control to electrical engineer of the Kansas City Railways is, in a measure, incident to the realignment of departments under the receivership.

With his other duties, Mr. Weber has for some years handled the technical features of power negotiations and cases before the Public Service Commission, and his intimate connection with these matters and the importance of power negotiations, pending and anticipated, are stated to have influenced the new appointment.

Mr. Weber is a graduate of Cornell University in the class of 1905. He is a member of the national electrical, mechanical and naval engineering societies. Before coming to the railways company, he had an extensive experience in the power field, where for several years he acted in responsible capacities on the design and construction of steam and hydro-electric properties. His electric railway experience includes connections with the Lehigh Valley Transit Company, the Kansas City, Clay County & St. Joseph Railway, and the Ironwood & Bessemer Railway & Light Company.

Mr. Cady Goes to Utica as Claim Agent

Herbert E. Cady, who succeeds Joseph S. Kubu as claim agent for the New York State Railways at Utica, began his railway duties in 1903 as a conductor on the Syracuse city lines. After a few years as a conductor, part of which time he was employed on the Syracuse-Utica third-rail line, he was appointed to the claim department force as an investigator.

He served as an investigator from 1907 until last year, when he was made assistant to Ansel D. Brown, claim agent for the Syracuse branch of the New York State Railways. He was appointed to succeed Mr. Kubu on May 16, much to the delight of his many friends.

Mr. Cady is a native of Chicago, but at an early age moved to Geneva, N. Y.

Frank L. Smith, Dwight, Ill., took office on April 11 as chairman of the Illinois Public Utilities Commission. At the same time he announced the appointment of William H. Culver, a former Chicago newspaper man, as his secretary. Mr. Smith was the unsuccessful rival of William B. McKinley, president of the Illinois Traction System, in the election for United States Senator last fall.

B. J. Yungbluth, supervisor purchasing and supplies, Philadelphia Rapid Transit Company during the absence of G. A. DuCasse, who was temporarily assigned to other duties, on June 1 resumed his duties as a member of the co-ordinating staff. G. A. DuCasse, temporarily assigned to the staff of the vice-president of accounting and finance, has resumed his former duties as supervisor purchasing and supplies.

E. W. Lewis has resigned as assistant general manager of the Iowa Railway & Light Company, Cedar Rapids, Ia., and has entered the business field for himself, forming the firm of E. W. Lewis & Company, wholesalers of electrical supplies. He became connected with the Iowa Railway & Light Company as superintendent of transmission lines, and he also held other positions with that company before becoming assistant general manager, the office he has just resigned. He was formerly with the Westinghouse Electric & Manufacturing Company, first in East Pittsburgh, Pa., and later in Baltimore, Md.

C. C. Chappelle, who has been representing the eastern security holders of the New Orleans Railway & Light Company, New Orleans, La., in the negotiations with the city looking toward a settlement of the problems confronting the company, is well known in electric railway circles. He was at one time one of the three members of the executive committee of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo. From 1911 until 1914 he was vice-president and general manager of the Federal Light & Traction Company, New York. Previous to this and immediately after his graduation from Purdue University in 1895 most of Mr. Chappelle's associations were with the Westinghouse interests.

Lewis B. Stillwell, consulting engineer, has attained additional distinction. He has just been named a member of the board composed of six engineers to study the country's transportation systems and to suggest ways for bettering the earning power of the railroads. His associates on the board will be John F. Stevens, Col. F. A. Molitor, J. F. Wallace, W. L. Darling and W. W. Colpitts. The board will be known as the "Board of Economics and Engineering." The members will act in the interest of the National Association of Owners of Railroad Securities. Every one of the appointees is an expert railroad man of long experience and national reputation, and the selection of Mr. Stillwell as a member of this company is a tribute to him personally and to the electrical industry, with which his entire career has been associated.

L. H. McCray has been appointed assistant to C. A. Hall, general manager of the Eastern Pennsylvania Railway, Pottsville, Pa. Mr. McCray was formerly assistant manager of the New England District of the Emergency Fleet Corporation, a position he accepted after his resignation as general manager of the Atlantic Shore Railway, Sanford, Me. Mr. McCray began his railway work with the Winnebago Traction Company, Oshkosh, Wis., which he served in various capacities from 1904 to 1907, when he resigned as assistant foreman of the transportation department of the company to become superintendent of the Sterling, Dixon & Eastern Railway, Sterling, Ill. He continued with this company until March, 1908, when he resigned to accept the position of trainmaster and assistant general manager of the Atlantic Shore Line Railway. Later he was promoted to the superintendency of this road and in 1911 was elected general manager of the Atlantic Shore Railway, Kennebunkport, Me., which had succeeded the Atlantic Shore Line Railway.

Obituary

Dr. Edward B. Rosa

Dr. Edward Bennett Rosa, chief physicist of the United States Bureau of Standards, died suddenly in his office on May 17.

Dr. Rosa did very notable work in the scientific field and particularly in electrical research. As a pure physicist alone he by his accomplishments and studies won for himself a place of honor among foremost scientists of the day. Moreover, he was an executive, guiding carefully and intelligently the work of more than 100 technical assistants in the electrical division of the bureau, the department which had been built up and enlarged by him. The details of what is known now as the National Electric Safety Code were worked out in the bureau's electrical division under his supervision.

Some of the scientific work includes the redetermination of the ratio of the units of electrical measurement, the measurement of the electrochemical equivalent of silver, the invention of new methods for measuring capacity and inductance, calculations of electrical characteristics of coils, specifications of the international candle, and electrolysis research. In connection with the last-named study he has made investigations in a great many cities and proposed methods of mitigating electrolysis caused by stray railway currents.

Dr. Rosa was born in Rogersville, N. Y., in 1861, and was graduated from Wesleyan University, Middletown, Conn., in 1886. Five years later he received his doctor's degree from Johns Hopkins University. He returned to Wesleyan as a professor of physics, where he invented a number of measuring instruments, besides conducting important investigations in electrical measurement.

In 1901 he joined the Bureau of Standards as a physicist. He was a Fellow of the American Institute of Electrical Engineers, a former director of the Illuminating Engineering Society, and one of the most active members of the American Engineering Standards Committee.

Henry W. Beebe

Henry W. Beebe, supervisor of equipment of the Connecticut Company, New Haven, Conn., died on May 19. Mr. Beebe had been in poor health for about two years but had been on the job till the end, his final illness lasting about one month.

Mr. Beebe had been in the electric railway business from its start. He was a machinist by trade, starting as an apprentice with the New Haven Clock Company. He was later with the Ansonia Electric Company, manufacturers of telegraph instruments and other electrical appliances. In December, 1893, when the old Fair Haven and Westville Railroad started to electrify, he entered the shops of this company as a machinist, later becoming the general foreman of the road. This position corresponds to that of master mechanic today. When the consolidation was effected which resulted in the Connecticut Company, he became the master mechanic of the New Haven Division. On Oct. 1, 1915, he was made supervisor of equipment of the entire system.

He was a mechanical genius in things having to do with railway rolling stock and was an expert consultant, in which capacity he acted, principally, during the last two or three years. He was sixty-four years old when he died.

William M. Grote, prominently identified with the building of the interurban lines in the Spot River Valley of Illinois, died on May 15 at the age of seventy-one. These lines, 40 miles west of Chicago, have since become a part of the Aurora, Elgin & Chicago Railroad, Aurora, Ill. Mr. Grote had resided in Elgin, Ill., for the greater part of his life and had been for many years the leader in the business activities of that community. At the time of his death he was connected in an official capacity with several banks and business enterprises.

Theron R. Hull, superintendent of the Connecticut Company, New Haven, Conn., until his retirement from active pursuits some years ago, died on May 2 in his seventy-eighth year. His initial street transportation experience dated back to horse-car days. He was superintendent of the Shelton Avenue car line in New Haven and when the Winchester Street Railway absorbed this line Mr. Hull became superintendent of the system. With the advent of the electric car he remained in the service as superintendent after the Connecticut Company, then known as the Consolidated Company, took over all the rails and equipment of the other railway properties then operating in New Haven.

Karl G. Roebling, active head of John A. Roebling's Sons Company, died of apoplexy on May 29. He had been president since October, 1918, when he succeeded his uncle, the late Charles G. Roebling. Mr. Roebling was born July 7, 1873. He prepared for college at Lawrenceville and was graduated from Princeton in 1894. Upon the completion of his schooling he worked at the Roebling mill and was shifted from one department to another until he had become familiar with all phases of the work. The Roebling company has been brought into international fame by the building of the Brooklyn and Williamsburg bridges, the suspension type of construction having been installed by John A. Roebling, the founder of the business. Col. Washington A. Roebling, who has been elected president of the company to succeed his nephew, was the engineer in charge of the bridge construction.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Railway Material Prices in February, 1921 and 1919

Several Products Now Cost Less Than Two Years Ago—Average Price Shows 8 per Cent Increase

From time to time tables have appeared in these columns showing the comparative increase in peak prices of railway material over the pre-war level. Since the downward movement of commodities set in, however, data showing just how great the recession has been in the electric railway field has been incomplete. In this connection one of the large Canadian traction companies has compiled figures which are appended below, comparing prices of material purchased by it in February, 1921, and in 1919. The comparison is made on the basis of actual purchase cost. At the same time the percentage of price increase on these products in 1919 compared with pre-war prices is presented. From the two columns of figures a fair idea of where present-day prices stand can be gained, though it must be recalled that the market represented in most instances is Canada and not this country.

The list presents the latest figures available on any considerable number of items purchased recently, but of course during the three months since February prices in a number of lines have receded still further. The greatest recession over the 1919 cost is shown in trolley wire, with nearly 39 per cent, while linseed oil is a close second with about 36 per cent. White lead, rattan, carriage and machine bolts, dry batteries and cedar poles also show considerable decreases in cost. The price of coal it appears, represents a greater increase since 1919 than any other material listed, with about a 50 per cent increase for both hard and soft coal. Lubricating oil, track bolts, cement, headlights, sand, certain armature coils, brakeshoes and pinions follow next in the order named. The average cost of all the materials given below covering the two-year period past shows an increase of 7.77 per cent.

PERCENTAGE OF INCREASE

Material	Unit	1919 Over 1913	1921 Over 1919
Bases, trolley	Each	113.1	3.73
Batteries, dry	Each	105.0	e**10.56**
Bell cord, No. 9	Lb.	140.0	1.19
Bell cord, No. 7	Lb.	143.0	0.00
Bolts, carriage, 4x⅜-in	100	146.8	**6.02**
Bolts, machine, 6x⅜-in.	100	135.5	**14.96**
Bolts, track, 3½x¾-in.	100 lb.	75.0	27.85
Brake shoes	Each	180.6	24.75
Bricks, fire	1,000	100.3	***6.24**
Brake hangers	Each	97.9	11.70
Coal, anthracite	Net ton	65.2	49.55
Coal, steam	Net ton	132.4	51.35
Coils, armature, 12A	Set	61.6	*24.93
Coils, armature, 101B2	Set	92.2	* 6.76
Commutators, 12A	Set	93.2	10.10
Copper wire (trolley)	Lb.	82.4	**38.71**
Cement	Bag	141.2	27.55
Gears, 12A	Each	305.3	9.38
Gear cases	Each	235.8	12.15
Grease motor	Lb.	100.6	6.66
Grease, curve	Gal.	25.9	11.77
Headlights	Each	47.4	27.39
Fittings, malleable iron	100 lb.	117.1	20.00
Oil, ammonia	Gal.	80.5	6.35
Oil, lubricating, black	Gal.	24.1	33.33
Oil, linseed	Gal.	171.4	**35.79**
Pinions, 38B	Each	245.1	22.93
Poles, cedar, 45 ft	Each	48.5	***8.50**
Poles, trolley, 12-ft	Each	139.2	16.40
Rattan, seating	Sq.ft.	71.9	**4.08**
Rattan, sweeper	Lb.	244.4	**29.03**
Rails, 72-lb	Gross ton	46.1	19.78
Sand	Load	140.0	25.00
Ties	Each	163.1	*10.00
Uniforms	Each	38.5	14.57
Wheels, car, 33 in	Each	79.6	2.85
Wheels, trolley	Each	91.0	11.52
Waste, white cotton	Lb.	105.9	**5.88**
White lead	Lb.	100.0	**12.59**

* Prices as of Dec., 1920; no material bought since this date.

e—Boldface indicates decrease.

Car Wheel Production Lowest in Years

Steam and Electric Road Buying Is at Minimum—Deliveries Are Prompt as Stocks of Raw and of Finished Material Are Fairly Good

A survey of the market among producers of chilled iron and rolled steel car wheels reveals virtually a uniform condition of light demand. Both steam and electric lines are buying the smallest number of wheels possible to meet their requirements, inquiries are scattered, and there are no large orders being placed. A representative producer normally turning out more than 1,000 chilled iron wheels daily reports that except for one or two steam roads there has been practically no business placed for the past six months.

An idea of the extent to which roads throughout the country are stocking wheels can be gained from the business of another manufacturer who is receiving orders for twenty to fifty wheels at one time at present, where the same orders formerly totaled 1,000 to 2,000 wheels. An optimistic note is sounded by a leading producer of rolled steel wheels, however, in reporting that the wheel tonnage holds up much better than other steel products, and that considering the present readjustment period through which we are passing, business is as large as could be expected.

Production, in view of the volume of buying, is down to low levels. Operation in extreme instances is nil, and some wheel manufacturers produce only when they accumulate sufficient orders to run plants for three or four days. Still others report a production as high as 40 to 60 per cent of capacity, but the general operating scale, it seems, is lower than it has been for many years. No trouble is experienced in making quick shipments, especially as competition is very keen at the present time. Foreign producers are making their influence felt too, as evidenced by a recent South American order for 10,000 steel wheels which was carried off by a German company in competition with British and American firms.

Stocks of raw and of finished material differ rather widely as some manufacturers in reducing their inventories carry only sufficient raw material to cover current orders and either no finished wheels at all or only enough to comply with contracts. For the most part, however, raw material stocks in this field are good, with here and there a producer who is overstocked. The same applies to the finished product, as some producers still have wheels carried over from the rush period of last year, but in general only a fair quantity are on hand.

The majority of producers, it seems, remain silent on the question of prices, but one of the leading manufacturers of chilled iron wheels is responsible for the statement that quotations are about 25 per cent below the peak and that future price developments are uncertain. Another view states that big price reductions cannot be made until plants are operated on a normal basis again. Nearly all wheel companies have reduced wages, though here and there one reports undiminished labor cost. The average decrease in wages has been from about 10 to 20 per cent, with an extreme of 25 per cent.

The industry appears to be about evenly divided over the business outlook in the car wheel market. Some producers see little or no prospect of any improvement in conditions this year, while others are optimistic in tone. This optimism is apparently based on the realization of lower railway labor costs and the expectation of freight rate reductions, which it is thought would encourage a gradual return of general business.

Electrification of Philippine Railroad

According to the *Bulletin of Government Commercial Agency in New York*, the Manila Railroad Company plans to develop the water power of the Agno River in central Luzon to supply electricity to operate the railroad. It is estimated that from 12,000 hp. to 15,000 hp. can be developed.

Uneven Conditions in Car Headlight Market

Survey of Situation Among Large Producers Reveals Up and Down Volume of Demand, Stocks and Production

A survey of the manufacturing situation among virtually all the large producers in this country of car headlights used by electric railways reveals uneven conditions of demand. One of the leading manufacturers reports that the volume of business in this line is good, and a couple of others state that though buying is confined largely to replacements, demand is within 80 per cent of last year and at a higher ratio than many other equipment lines. This favorable situation, unfortunately, is not general as a number of other headlight manufacturers are finding very little new business. Some of these state that present orders cover only replacements and repair parts, while some find that new equipment, especially safety cars, accounts for most of the business that is being placed.

KEEN COMPETITION FOR ORDERS FELT AMONG PRODUCERS

It would seem, on the whole, that the headlight market is by no means brisk, as evidenced by the keen competition for orders. This is reflected in the quality of service rendered to customers, as except for one producer who quotes four to six weeks' shipment on standard headlights, virtually every company is able to make immediate shipments. In the matter of stocks of the finished product, however, some variance is shown as a few producers are carrying a normally large supply but the majority are holding their inventory at as low a point as possible. On the other hand, large stocks of raw material seem to be the rule and low stocks the exception, though this feature is constantly tending more toward normal.

Very little uniformity to production is shown. Where stocks are large it is low, as also where few orders are being received, but where headlight stocks are low and a fair volume of current orders are received, operation keeps up accordingly. This accounts for the spread between production at 10 per cent of capacity in one instance and as high as 75 per cent in another. To accomplish this curtailment working forces have been cut in several instances, on an average of 20 to 40 per cent. A number of producers have reduced wages 10 to 15 per cent, but others report that they have made no flat reductions though bonuses and similar extras have been eliminated.

PRICES DOWN 10 TO 15 PER CENT SINCE FIRST OF YEAR

Headlight prices have been reduced 10 to 15 per cent since the first of the year or the peak level, and the further tendency would seem to be still downward inasmuch as at least one producer has just made a further cut this month. The outlook for business the balance of this year in this line is generally thought to be none too bright. A quiet market is expected to prevail, though starting with the fall there is hope that demand will gradually increase and reach normalcy again by next spring.

Increase in Trolley Wire Price Is Not General

Two Producers Advance Base Price One-Half Cent per Pound, but Copper Is Again Weak

In line with the gradual firming of the copper market over the past few weeks, at least two producers of trolley wire have increased their base prices to the extent of ½ cent per pound. This is interesting in the light of the prevailing opinion that an increase in buying will very probably follow a stiff advance of prices.

That this increased demand has not developed, it is thought, is because the copper market does not consistently hold its gains and the advance in base prices by wire producers has not been general. Within the past two weeks spot electrolytic copper touched a high range of 13½ cents per pound, but it has since receded and can now be bought for 13⅜ cents.

At the present time, though base prices are quoted, they do not represent an absolute indication of prices for the reason that the market is so strongly competitive these prices are not strictly adhered to. Among several of the leading producers base quotations range in gradations of ¼ cent per pound from 15 to 16 cents. The market remains fully as quiet as it has been over the past few months. Electric railways are showing little activity and buying is mostly for maintenance, though it is said that an increase in the number of inquiries from the West is noted. The foreign market is flat and, taken all in all, the outlook seems to point to a very quiet summer.

Producers are reconciled to this, however, and are buying copper from hand to mouth for the most part. Production is down commensurate with buying, and in a number of instances plants are operated only as orders are received. Deliveries can be made promptly and on an average range from ten days to two weeks and even better. Producers of trolley wire other than bare copper, such as composition material, report a fair stock on hand that is sufficient to care for orders immediately.

Hopes are now being pinned to the fall months, as it is generally expected that September and October will see a material increase in business in this line. The basis of this belief apparently is the tremendous unfilled need for wire in the industry that is known to be existent.

Dry Cell Prices Are Reduced

Leading manufacturers of dry cells, including "Columbia," "Eveready" and "Red Seal" makes, reduced prices last week. The drop was about 16 per cent.

Rolling Stock

Elmira Water, Light & Railroad Company, Elmira, N. Y., has received the first of the eight safety cars that were ordered from the Osgood-Bradley Company during April. Delivery of the remainder is expected to follow at the rate of two per week.

The City of Miami, Fla., which has been without street car service following the total destruction of existing storage-battery equipment by fire last fall, is erecting steel lighting poles which are also being so equipped as to carry trolley span wires ultimately. Plans leading to the actual purchase of rolling stock, however, have not yet been formulated.

Hartford & Springfield Street Railway Company, Warehouse Point, Conn., has purchased two cars from the Waterbury - Milldale Tramway Company to make up for the loss of four cars which were destroyed by fire in the company's barns a few months ago. Only two cars were bought as additional open cars are being substituted for the others that were burned. The Waterbury company is letting its cars go to replace them with one-man cars.

Franchises

Pacific Electric Railway, Los Angeles, Cal. — A franchise has been granted to the Pacific Electric Railway to construct, maintain and operate a single track on Third Street and other highways in the City of Long Beach, Cal.

Track and Roadway

Portland Railway, Light & Power Company, Portland, Ore.—Officials of the Portland Railway, Light & Power Company have consented to move the tracks on Foster Road to the center of the roadway, the work involving an expenditure of $200,000, in order that other improvements may be made. Franklin T. Griffith, president of the company, explained that at no time had the company refused to move its tracks in accordance with the wishes of the city council; the company, however, did not wish to make the move until such time as it was certain that the improvement would be carried out. Officials of the company agreed to lay new tracks. They proposed that no pavements be laid between the tracks, and that certain important intersections be designated for hard surface. The rest of the roadbed will be built up with crushed rock and macadam, and the city officials have agreed to this plan. It will be necessary for the city to purchase the private right-of-way on which the street-car tracks are now located, the strip being 30 ft. wide and 6,000 ft. long, valued at about $8,000.

Washington & Old Dominion Railway, Washington, D. C.—The Washington & Old Dominion Railway has received permission to construct and operate a bridge across the Potomac River at a point suitable to the interests of navigation, at or near Point of Rocks, in Frederick, Md.

Pensacola (Fla.) Electric Company.—The Pensacola Street Railway is building a spur track to the baseball park, a distance of six blocks from the Kupfrian park main line.

Montreal (Que.) Tramway.—At the present time the company has extensions in contemplation amounting to about 15 miles of track within the city limits. As it is, the requirements demand a thousand tons of rails per year to provide against wear and tear, depreciation and breakages. In all there are about 1,500 men engaged in track work alone for the tramway company, whose summer program of a $1,500,000 expenditure gives assurance of a very considerably extended industrial activity. This $1,500,000, it was pointed out, does not include the company's own renewals and maintenance work, but covers only work necessitated by the repaving of streets by the city, a cause which necessitated most of the work viewed by the officials in a recent inspection.

Dallas-Terrell Interurban Railway, Dallas, Tex. — Construction work will start in earnest on the Dallas-Terrell Interurban line within the next sixty days, according to Richard Meriwether, Dallas, vice-president of the company. Grading work on a two mile stretch near Mesquite is going forward, and the company expects to award the main contract for completion of the line some time before July 1. The interurban committee at Terrell reports that all deals are about closed assuring right of way through Kaufman county. The awarding of the contract will be somewhat delayed on account of the death of J. F. Strickland, president of the new company organized to build this line.

Power Houses, Shops and Buildings

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—The Terre Haute, Indianapolis & Eastern Traction Company will build a new terminal station in Terre Haute, Ind., this summer at a cost of $200,000.

Cincinnati (Ohio) Traction Company.—The Ohio Public Utilities Commission has approved a contract made early this year between the Union Gas and Electric Company and the Cincinnati Traction Company for furnishing electrical current to the latter company.

Toledo Railways & Light Company, Toledo, Ohio.—Toledo's new interurban station was opened to the public on June 1. It is located at the corner of Superior and Jackson Streets, opposite the old station.

Professional Note

Chester M. Clark, formerly head of the corporation department of Stone & Webster, Inc., and during the war secretary of the underlying company at Hog Island, and assistant to Matthew Brush, the president of that corporation, has been elected treasurer of Arthur D. Little, Inc., Cambridge 39, Mass.

Merton R. Sumner has been appointed chief engineer of Arthur D. Little, Inc., chemists, engineers and managers, Cambridge 39, Mass. Mr. Sumner was formerly chief engineer for New England of Fred T. Ley & Company, Inc., in charge of about 135 construction projects and more recently was chief engineer of the Fuller Industrial Engineering Corporation, a subsidiary of the George A. Fuller Company.

L. E. Gould, Chicago, has announced that he is planning to broaden his field to include the study of energy measurement problems for which his engineering staff is well adapted. Thus on any property he is prepared to select the type of cars which will best fit existing operating conditions from an energy conservation standpoint; to determine the comparative energy consumption of various types of motor equipment, different gear ratios, heater and other auxiliary circuits under service conditions; to make surveys on voltage drop, line loss and general characteristics of the distribution system preliminary to a rearrangement of feeder copper, and to measure the energy consumption of interurban cars or freight motors on city or foreign track, so as to give the correct rate of billing for energy consumption.

Trade Notes

Pressed Steel Car Company, Western Steel Car & Foundry Company have recently moved their offices to the Seaboard National Bank Building, seventh floor, 55 Broad Street, New York City.

The Howard-Geeseka Company, 802 Plymouth Building, Minneapolis, Minn., has been appointed sales representative of the Condit Electrical Mfg. Company, Boston, Mass., in the states of Minnesota, North and South Dakota, and the northern peninsula of Michigan.

Colonel Washington A. Roebling has been elected president of John A. Roebling's Sons Company, wire manufacturer at Trenton, N. J., to succeed his nephew, Karl G. Roebling, who died suddenly at his summer home at Spring Lake, N. J., on May 29. Colonel Roebling is 84 years old and has long been identified with bridge construction projects, the most notable of which was the Brooklyn Bridge.

The Stoker Manufacturers' Association will convene for its summer meeting at the Red Lion Inn at Stockbridge, Mass., June 14, 15 and 16. The program as outlined, besides taking in discussions on the handling of stoker business, publicity, advertising, etc., will take up the establishing of a research committee for certain lines of work, new uses of stokers and a discussion of the work of the recently created fuel sections of the professional section and the A. S. M. E. revision of the power test codes.

The Esterline-Angus Company is the new name of the former Esterline Company, Indianapolis, Ind. The original company was organized in 1900 by J. W. Esterline, and in 1910 D. J. Angus became associated with Mr. Esterline in a consulting engineering business. In 1917 he became a stockholder and director of the Esterline company. Two years ago these two men bought the interests of all other stockholders, and in view of their long association in both engineering and manufacturing work they have decided to change the name of the manufacturing company to that given above. There will be no change whatever in the general policy of the company, it is announced. Mr. Esterline will continue to be the executive in charge of sales promotion and advertising, and Mr. Angus will similarly direct production and engineering.

Mica Insulator Company, 68 Church Street., New York City, announces that it has won the suit brought last year against the Mica & Micanite Supplies Corporation, a subsidiary of an English concern, for infringement of the trade-mark "Micanite" which is used to identify the plaintiff's built-up mica insulation. Judge Knox of the District Court of the United States for the Southern District of New York, entered a decree ordering that the defendant corporation be enjoined from using the word "Micanite" in any way, even as a part of its corporate name.

New Advertising Literature

Bronze Products. — The American Brass Company, Waterbury, Conn., is distributing a sixty-four-page booklet covering its copper products, etc., including price lists.

Tobin Bronze.—The American Brass Company, Ansonia Branch, Ansonia, Conn., has issued a fifty-eight-page booklet describing its "Tobin bronze" and its uses, etc., with price lists.

Wire.—The Copper Clad Steel Company, Braddock P. O., Rankin, Pa., is distributing a leaflet showing loading tables and characteristics of its Aristos "Copperweld" wire.

Space Heaters.—Space heaters for commercial and domestic heating are discussed in a leaflet, 3442, just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh.

Bus and Board Fittings.—The Erie Electrical Equipment Company, Inc., Johnstown, Pa., has issued supplementary bulletins on split porcelain insulators, wall and floor flanges and main castings for three-way and four-way pipe combinations.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, June 18, 1921 *Number* 25

The N. E. L. A.'s Contribution to Power Plant Literature

THE National Electric Light Association does a good piece of work for more than its own members in the compilation each year of treatises on power matters. The reports of its special committees are so complete that they are useful to all power consuming industries. This is particularly true of the report of the committee on prime movers, which has now come to be a veritable encyclopædia in its field. The 1921 report, abstracted elsewhere in this issue, is a voluminous document replete with data which are just as applicable in the electric railway field as in that from which they were collected. The American Electric Railway Engineering Association has a committee on power generation and other committees whose activities parallel even if they do not duplicate those of the N. E. L. A. committee. It might be in the interest of economy of money and effort for the corresponding committees of these two and other associations to get together in some way. A practical suggestion to begin with is that the Engineering Association committee on power generation bring up for discussion at Atlantic City some of the high spots in the N. E. L. A. report.

One excellent feature in the compilation of this report is the way in which manufacturers of power machinery and auxiliary devices are invited to tell what they are doing respectively to advance the art. While the N. E. L. A. takes no responsibility for these statements, it does act as the clearing-house for the information. At the same time the manufacturers' statements are brought up for scrutiny and woe betide any one whose expressed hopes for his product do not tally with service performance.

Nominations for Mayor Come Thick in June

LIVELY times appear to be ahead this summer for New York City. The politicians are working overtime, and the near politicians are doing the same. The day is already counted lost upon which some one does not arise to announce himself as candidate for Mayor at the fall election. There are reforms enough ahead for busy hands to carry out, but the one to which all aspirants look longingly is the traction issue. Mr. Hylan, the present incumbent, seeks to preserve the present 5-cent fare. Mr. Bennett, another aspirant, seeks to restore it. Whatever other hopes and ambitions Mr. La Guardia and Mr. Curran, receptive candidates, may have, they also see the traction issue as one of the outstanding questions calling for immediate attention. It seems strange that where there is such unanimity of opinion, there could possibly be so much confusion of thought.

Flimsy pretexts for making an issue of the traction question abound in the reasons advanced by all the prospective candidates, particularly in view of the law enacted by the last Legislature, but the present Mayor cuts the most lamentable figure of all with his claims of preserving the 5-cent fare. The surface lines have practically all been broken up and returned to their original owners, so that 10 and even 15-cent fares are in force in many places where the 5-cent fare prevailed. Moreover, many lines have been discontinued entirely. As for the free transfer, it has become practically a thing of the past except at mass transfer points on the rapid transit lines. The passenger on the subway or the elevated pays a 5-cent fare, but then on these lines, tied in for operation under contract with the city, there is a deficit of many millions of dollars a year exclusive of interest on the city's investment for construction. This latter charge is passed on to the taxpayers and thence to the rent payer, who, in New York, is groaning under a frightful load of increased valuations and increased tax rates. Theoretically, a 5-cent fare. Practically, no such thing. It is not considered good form in the present age to confess to being old fashioned, but if one judges the transit situation in New York on the generally accepted standard of the past it would appear that Mayor Hylan, in contending that he has preserved the 5-cent fare, is guilty on the count of fraud.

A Dangerous Precedent in the Making

UNDER present circumstances, municipal ownership and operation of the entire local transportation system of Detroit seems inevitable—for better or for worse. Thus is the continuous political fight centering about the Detroit United Railway for more than twenty-five years apparently to be ended in the course of the next few years. The people have spurned all offers made by the private company and voted for municipal ownership and for the bond issues necessary to build new lines and to purchase certain existing lines. The municipal program has gained great momentum and it is being pressed forward on a big scale. Undoubtedly, the piecemeal system of purchasing existing lines which is being followed, with the franchises expired on a large part of the D. U. R. trackage, will prove very advantageous for the city. This will enable the municipal authorities to develop quickly a municipal transportation system of importance. Only those lines particularly wanted will presumably be purchased for a time, but as necessity to pay two fares to the two separate companies becomes more widespread, there will probably develop a pressing demand for complete municipal ownership.

The speed with which the municipal system is now being built and acquired is evidenced by the prospect of a mileage increased from 18 at the end of 1920 to 130 at the end of 1921. The project having gained such proportions, there is not an encouraging likelihood that the tide toward municipal ownership in Detroit will be stopped.

When all the circumstances are considered perhaps this is the only solution of Detroit's traction turmoil. The entrance of new interests in the D. U. R., as recently occurred, may change the situation. But if not, the concern of the industry is that the outcome of this particular quarrel while local in origin is far reaching in influence. If by chance the Detroit municipal ownership venture should appear to be a success, it will establish a powerful precedent for the ceaseless use of municipal ownership advocates—the first important precedent in the East and the most important in the country. Furthermore, if there can be such a thing as a successful municipal street railway system, the policies being pursued by the present Mayor, Street Railway Commission and management will tend to make it so. J. S. Goodwin, general manager, has declared that he has been under no political dictation as to jobs, equipment or methods, and that he has been free to build a railway system as a railway man would, taking into account the legal and physical limitations imposed. The railway organization has been built up of seasoned railway men who have years of experience with private railway companies behind them. As for the construction of the physical plant, while it may not be the best the industry has known, it is at least as good as that which has been built in recent years by many privately operated companies.

So far so good. While the present Mayor remains in control perhaps the railway venture will be conducted largely as a business proposition, free from political influence. But when a new administration steps in, what then? What assurance is there that the new Mayor will not succumb to the great temptation to exploit the railway, with its large number of jobs, to take care of his political henchmen and to use it in furthering his political power?

This is one of the great weaknesses of the municipal operation of any utility, especially one having so large a payroll as does a street railway. It is a great point of danger to the interests of the public. And in order that the public may know that its best interests will be served by a private transportation agency, it behooves the private companies continually to demonstrate this fact by providing excellent service at low cost and adopting constructive methods of creating and maintaining good public relations and public understanding of the aims of the company. This is the only dependable antidote for municipal ownership. When such conditions prevail, there will be no widespread demand for it, nor indorsement of the views of the unscrupulous persons who spread pernicious propaganda based largely on high-sounding falsehoods.

Avoid Contentious Publicity

THESE columns have been replete for a number of years with suggestions about the great desirability of the electric railways fostering publicity about themselves and of following the open door policy about all matters of information pertaining to them. Most of the companies that have undertaken this means of improving their relations with the public have met with some success. One example, however, stands out conspicuously as a failure. In this particular city, a persistent and energetic campaign of publicity has been engaged in for several years, but the attitude of the public toward the company has gone from bad to worse.

There is much to support the opinion that the nature of the publicity distributed has helped to undo the company rather than to improve its relations. This publicity has been largely controversial, full of rancor and more destructive than constructive. While all that has been said in the company's publication is probably true and perhaps was mild as compared to the provocation, yet aside from venting the feelings of the utility, not much was accomplished. It seems to have been pretty well demonstrated that the public is not sympathetic toward this kind of publicity and that it is not effective in accomplishing the object sought. This comment is made simply to point out the obvious lesson.

Brake Rigging Is an Important Safety Link in Car Equipment

THE great advantages of electricity as a motive power for use in railway service are its convenience, its economy in power, and the increase in track capacity made possible by its use. This increase in track capacity comes directly from the use of higher schedule speeds, which, in short runs, are made possible through higher rates of acceleration and retardation. In fact, the more adequate the provision for rapid and easy acceleration and retardation, when stops are frequent, the better the purpose of the railroad is served. It is obvious also that the saving in time secured during retardation is just as valuable as that obtained during acceleration. When braking commences, a car may possess substantially the same energy that was put into it from the power plant during acceleration. This energy can be dissipated in seconds or in minutes, but the shorter the time the nearer the company comes to getting double value from the power house, so far as time saved is concerned.

The fundamental necessity of a brake, both as a safety and a capacity increasing device, needs no emphasis, and the link in the braking process which connects the power-receiving end with the power-delivering end is the foundation brake rigging. This is as vital an element in brake mechanism as any other. With an idea of bringing more forcibly to the attention of its readers the value of keeping the foundation brake rigging in a high state of efficiency, this paper has been publishing in the past six monthly mechanical issues a series of articles by H. M. P. Murphy, describing the essentials of brake rigging and the forces developed during braking. This series of articles was written with the definite purpose of presenting this subject to the men responsible for brake operation and maintenance rather than to provide data for construction or design. The information has been given in as simple language as possible, and the mathematical formulas employed should not be confusing to the average workman. The examples have been taken from actual cases now in operation on existing electric railways, and the many illustrations given should enable the reader to see the essentials of the various parts, the functions that they perform and the importance of keeping all in proper condition and adjustment.

The concluding article of this series, which is published in this issue, deals particularly with piston travel and its effect on producing short stops through the saving of time in having this properly adjusted. When all parts are in proper condition, the capacity or pull of the rail is the measure of retardation that can be developed. However, with improper adjustment and worn parts, the condition of the braking equipment is the measure of the retardation developed. This shows the value of proper maintenance and adjustment in this vital connecting link of the braking system, if high braking efficiency is to be maintained.

Investment in Instruction Takes Little Capital

MORE and more of late one reads in the popular magazines and house organs of instances where the patronage of customers is lost through discourtesy, or, to say the least, through thoughtlessness, on the part of the person coming in direct contact with the public. People have reached the stage where courteous treatment is not only expected but demanded, and any lack of a "please-the-public" attitude means the loss of trade, business, etc. If the business is such that a person may transfer his patronage to some other concern, he does so, and probably the incident sinks into oblivion in his mind. On the other hand, any incivility toward him in the sale of a commodity in whose selection or use he has no choice incurs a more lasting enmity.

Here is where the electric railway business meets a problem difficult of solution. Platform labor, perforce, is unskilled, but the industry must have high grade salesmen to sell rides. Regardless of the excellency of service, good will cannot be created or maintained without the utmost co-operation on the part of the employees of the railway.

Electric railways are confronted by this dilemma more than any other utility. Power and lighting are mere matters of maintaining an unimpeachable service over which the managers have a definite control. This is practically their only public contact and the criterion by which the public judges. The telephone approaches the railways in respect to the circumstances requiring the maintenance of pleasant relations with its clientele, but the direct contact in this case is lacking. A speedy connection followed by a good wire is all that is asked or, in fact, expected.

To have the man on the rear end working not only mechanically but in spirit is possible and is being done. The Fifth Avenue Coach Company has accomplished wonders in furnishing a well-liked service by having its conductors cultivate public friendship. There are numerous other properties the managements of which enjoy this reputation, but they are not numerous enough.

Instruction of new employees is a subject to which ever-increasing thought is being devoted, though principally to the mechanical details of the duties required. In this schedule of instruction a place should be given to teaching the fundamentals of salesmanship, a term which includes not only the ability to sell rides but to make the rider glad and satisfied with his purchase. True selling ability instills a "come-again" feeling in the customer. It is a knack that must be cultivated and, when cultivated, capitalized. Now that the labor market is an employers' and not an employees', the men who, by training, can be developed into courteous and efficient salesmen should be sought. The support and confidence of the public can probably be no more quickly restored than through the trainmen, in whom has been instilled the paramount necessity of these virtues. Since the apogee of hardship has been passed, the time is now ripe to regain the public esteem in this respect and reap the valuable benefits therefrom.

Instruction of the sort mentioned requires only a very small capital outlay. This, with the fact that the returns are large, should make an appeal to railway men at this time.

The Function of Every Committee Should Be Clearly Defined

THE editors of this paper attend numerous committee meetings in the course of the year, many as guests, some as members. They thus gain a perspective of the inside work of several associations and secure "atmosphere" for their writing. The general impression gained from this salutary exercise is one of respect for the quality and quantity of the work thus done behind the scenes. At the same time committee activities often, nay generally, give evidence of lost motion through what might be termed "lack of definition of function or purpose."

It is a trite saying that in rifle practice a clear view of the target is essential to accuracy of aim, but the principle applies everywhere else, including committee activities. Hence before starting work, each committee ought to formulate its purpose, the needs of its clientele and the practical results which it can reasonably be expected to secure by consistent effort.

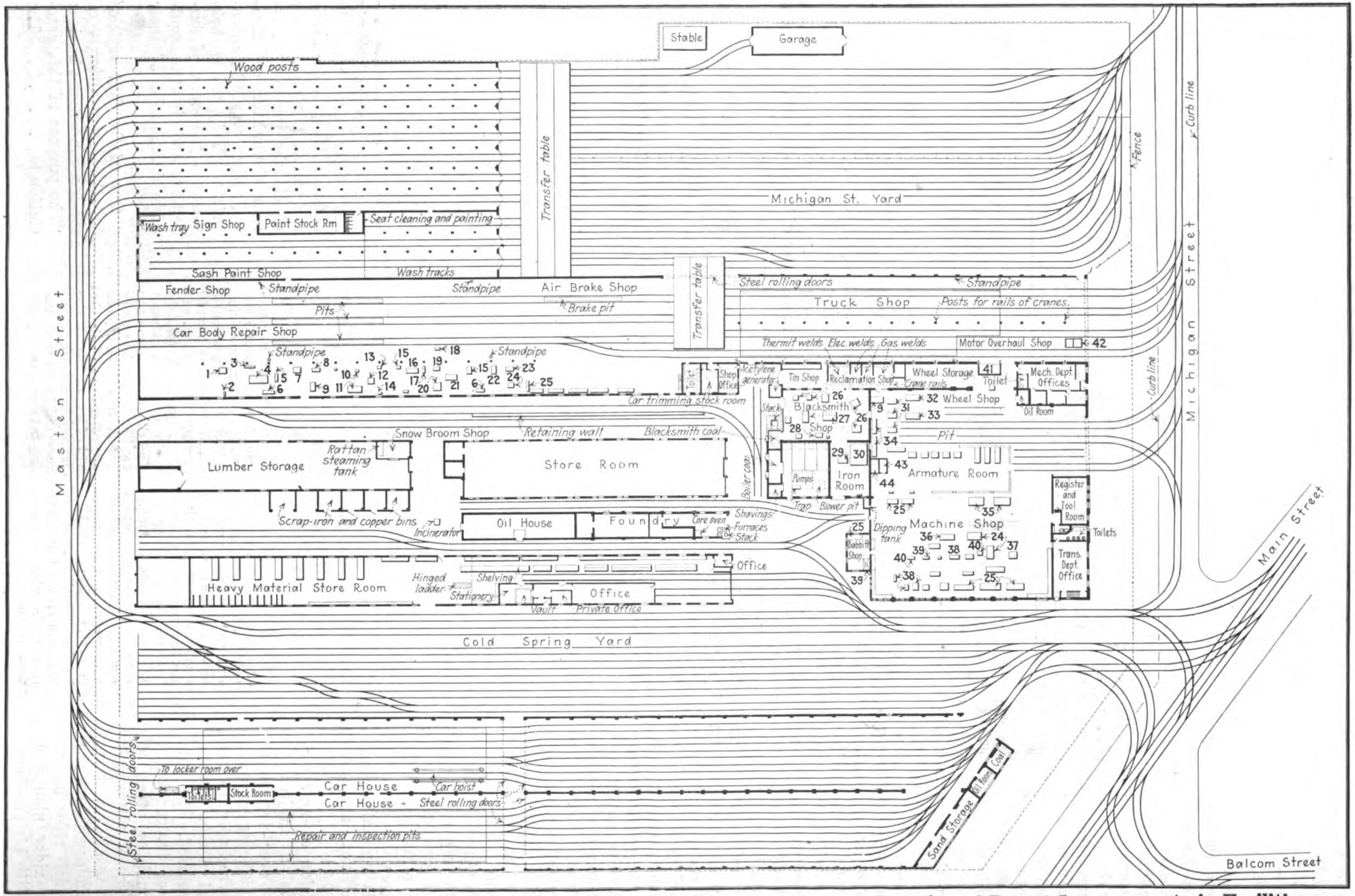
To be sure, many associations now set down lists of topics which committees are expected to consider, and this is all right as far as it goes. But it does not go far enough. Either the men who get up the lists, or the committees themselves, should define the point of view of the work. For example, take the heavy electric traction situation. It is a conspicuous case because committee work in this field is in the formative stage. Eight or nine national associations are active here. Their committees are duplicating work. They neither individually nor collectively have their purpose clearly defined. They need a central steering committee, for which the name "American Committee on Electrification" would be appropriate. This would help them in the work of definition and in the equitable distribution of their activities.

One of the first articles in the constitutions of most organizations begins: "The purpose of this association is . . . ." The same plan might well be followed by committees in their work.

Quotation from the Federal Electric Railways Commission Report

No. 25

THROUGH this system of financing and management (holding companies and banker control) the utilities have been largely controlled by persons living distant from the community affected by a particular electric railway, whose prime consideration has been to secure a return upon the property. This "absentee" management and control has not been successful in bringing about the proper spirit of co-operation between the local managers, employees and the public. Since the electric railway companies come into immediate daily contact with large numbers of people, it is of the utmost importance that the industry should gain and hold the respect, confidence and good will of its patrons. If the local public should invest its money in the stock and bonds of its local utilities there would be an improvement in the relations now existing between the corporation and the public.


Masten Street
Michigan Street
Main Street
Balcom Street
Curb line
Fence
Stable
Garage
Wood posts
Transfer table
Michigan St. Yard
Wash tray
Sign Shop
Paint Stock Rm
Seat cleaning and painting
Sash Paint Shop
Wash tracks
Fender Shop
Standpipe
Air Brake Shop
Brake pit
Pits
Car Body Repair Shop
Steel rolling doors
Truck Shop
Posts for rails of cranes
Thermit welds
Elec. welds
Gas welds
Motor Overhaul Shop
Toilet
Shop Office
Acetylene generator
Tin Shop
Reclamation Shop
Wheel Storage
Crane rails
Wheel Shop
Mech. Dept. Offices
Oil Room
Car trimming stock room
Stack
Blacksmith Shop
Pit
Snow Broom Shop
Retaining wall
Blacksmith coal
Rattan steaming tank
Lumber Storage
Store Room
Boiler coal
Pumps
Iron Room
Armature Room
Register and Tool Room
Toilets
Scrap-iron and copper bins
Incinerator
Oil House
Foundry
Core oven
Shavings
Furnaces
Stack
Trap
Blower pit
Dipping tank
Babbitt Shop
Machine Shop
Trans. Dept. Office
Office
Hinged ladder
Shelving
Stationery
Vault
Private Office
Heavy Material Store Room
Cold Spring Yard
To locker room over
Toilets
Stock Room
Car House
Car hoist
Car House - Steel rolling doors
Repair and inspection pits
Sand Storage
Oil Room
Coal
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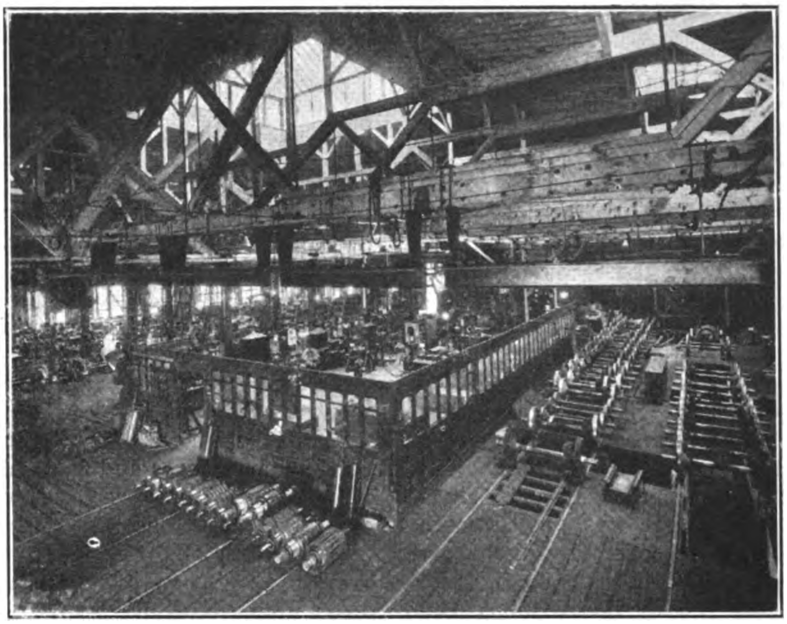
Plan of Cold Spring Shop Property of International Railway, Buffalo, N. Y., Showing the Location of Recent Improvements in Facilities

1—Resaw.
2—Stock saw.
3—Sheet metal rolls.
4—Double surface planer.
5—Automatic knife grinder.
6—Jointer.
7—Band saw.
8—Automatic mortising and boring machine.
9—Motor.
10—Mortising machine.
11—Sticker.
12—Pony planer.
13—Drill press.
14—Emery wheel.
15—Circular saw.
16—Boring machine.
17—Grinder.
18—Chain mortise.
19—Carver.
20—Sander.
21—Molder.
22—Tenoner.
23—Band saw.
24—Shaper.
25—Lathe.
26—Forges.
27—Hammer.
28—Oil furnace.
29—Shear.
30—Iron rack.
31—Boring mill.
32—Wheel press.
33—Wheel grinder.
34—Air compressor.
35—Wheel lathes.
36—Grinder.
37—Milling machine.
38—Drill.
39—Radial drill.
40—Saw.
41—Motor shell oven.
42—Motor shell dipping tank.
43—Armature and field baking oven.
44—Impregnating oven.

Shop Notes from Buffalo

Reclamation Shop Is Producing Attractive Savings—Dipping of Motor Shells a New Feature—Ingenious Plan for Portable Mounting of Electric Locomotive Control Apparatus Developed—Shop Layout Changes Here and There Tend to Facilitate Maintenance Practice



IN THE CENTER OF THE MACHINE SHOP IS HOUSED THE ELECTRICAL DEPARTMENT, IN AN INCLOSURE SET OFF BY A PARTITION MADE OF OLD CAR DOORS

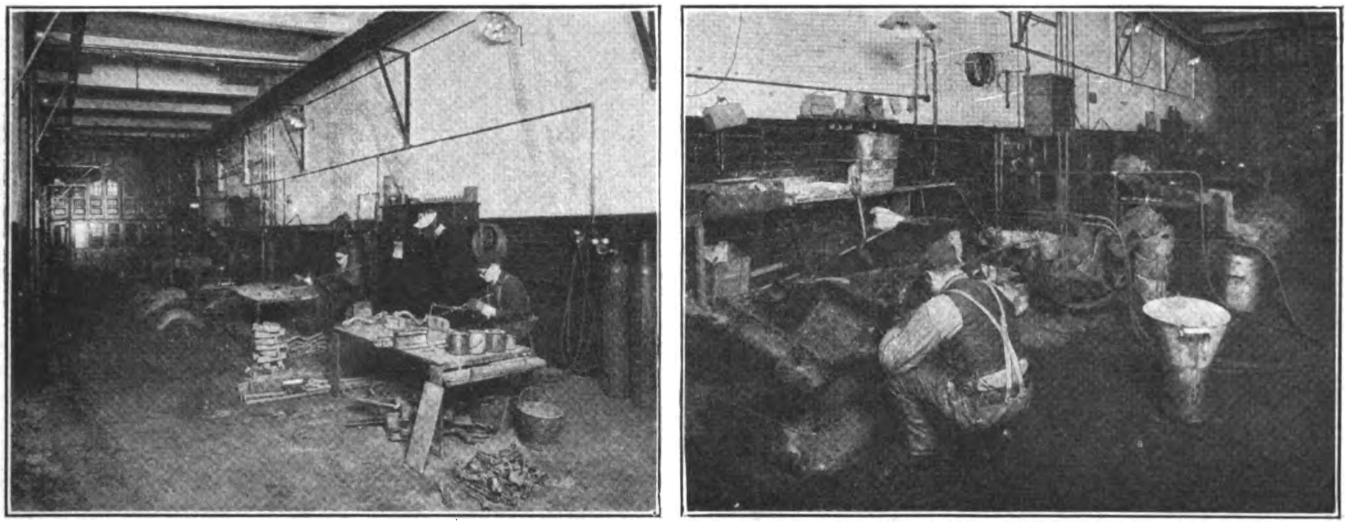
THE practices followed in the Cold Spring shops of the International Railway at Buffalo, N. Y., now operated by the Mitten Management, Inc., have been mentioned and illustrated in the ELECTRIC RAILWAY JOURNAL from time to time. Recent articles have covered dipping and baking of armatures and field coils (Feb. 21, 1920, page 286) and compressor maintenance (March 3, 1920, page 608). Although these shops have been in use for many years they are well adapted to modern maintenance practices and they are being constantly modified to meet changing conditions. The present article embodies the observations of a member of the editorial staff of this paper who visited the shops recently.

THE WELDING SHOP

The outstanding feature of recent changes is a welding shop where gas, electric and thermit welding is done in close co-ordination with the sheet metal and forge shops. The three shops are operated under the foreman of the reclamation department, who is thus able to subdivide the reclamation work among the three to produce the best over-all results. The welding and sheet metal shops occupy a long narrow room, 16 ft. wide, which was created by putting a concrete roof with skylights over a runway between the truck shop on one side and the wheel and blacksmith shops on the other. At present the 150 ft. of available length is divided up by means of light partitions thus: The tin shop has 32 ft.; the welding shop (including small office), 102 ft., and the motor-shell oven, 16 ft.

The reclamation or welding shop may be considered as divided longitudinally in half, one side being an 8-ft. runway and storage space, which is served by a trolley crane. On the other side are stalls separated by light, portable partitions, about 8 ft. high, for the three types of welding. The generator used to furnish acetylene for the gas welding is housed in a small "lean-to" adjacent to the tin shop.

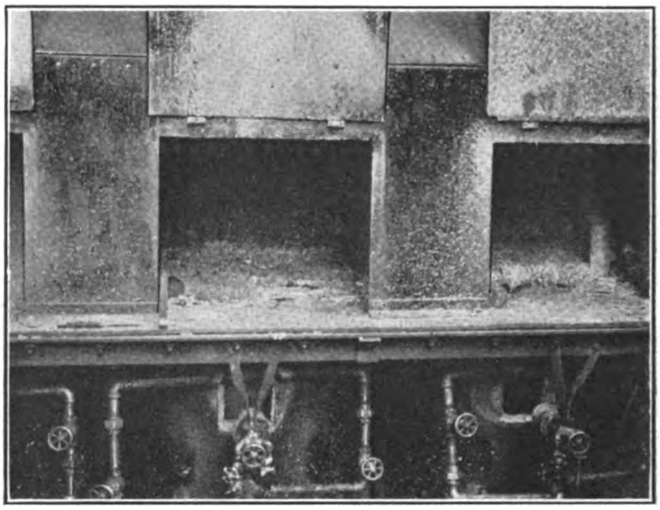
A summary of the work which has been done in the



TWO VIEWS IN THE NEW WELDING SHOP

View at left is toward tin shop and shows crane and crane runway, electric welders in foreground and thermit welder in background. View at right shows thermit welder in foreground at work on the repair of a truck frame. The portable partitions between welders' stands were removed for the purpose of making these pictures.

MICHIGAN STREET FRONT OF COLD SPRING SHOPS
The photographer fortunately caught two important pieces of equipment just as they were being put away in the carhouse.



PART OF ROW OF BABBITT POTS
These are heated by gas or kerosene burners and have thermostatic control for babbitt temperature.

reclamation shop during recent months, as gaged by the dollars saved over costs of replacement without reclamation, is given in an accompanying table.

Among recent interesting jobs of welding two were those illustrated. One is a repair to a piece of manganese special trackwork, a switch in which the tread had been broken away. An insert was welded in to replace the broken part and a plate was welded on the side to support it, with the excellent result shown. The second job is the welding of oil boxes on the bearing housings of old motors built for grease lubrication, also illustrated. The routine work consists of the usual run of patching worn and broken gear cases, mending broken motor shells, etc. Thermit is used to a considerable extent on truck frames, the material being bought in large quantities. This is done in the interest of durability, on the principle that where much metal is to be added the thermit process is in the end economical, even if more costly at the time because the metal in the weld is of very high quality.

DIPPING AND BAKING PROGRESS

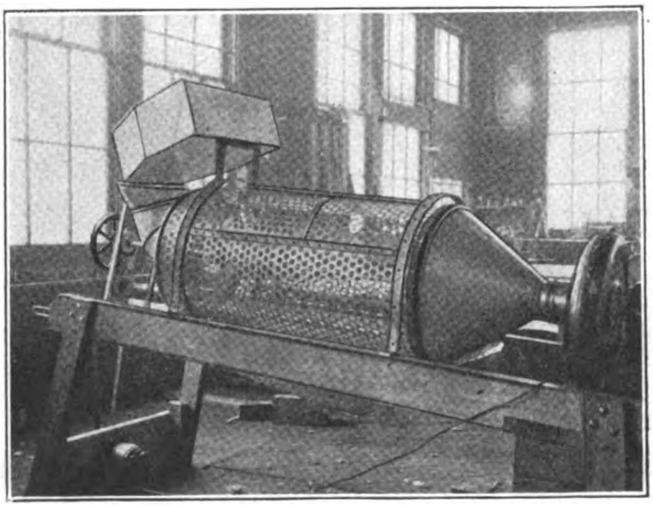
Supplementing former dipping and baking practice, as described in the earlier article referred to, the company is now subjecting small motor shells to this process and is preparing to do the same even with the largest motors. A heavy black varnish is used for fields and clear varnish for armatures. A special large dipping tank has been installed near the front of the motor overhaul shop.

In connection with the dipping and baking equipment used for armatures and field coils, located near the armature room, it is proposed to substitute a monorail crane for the one now in use, which requires the transfer of baskets of field coils from a crane bar outside the oven to one inside. The proposed monorail would run direct into the oven.

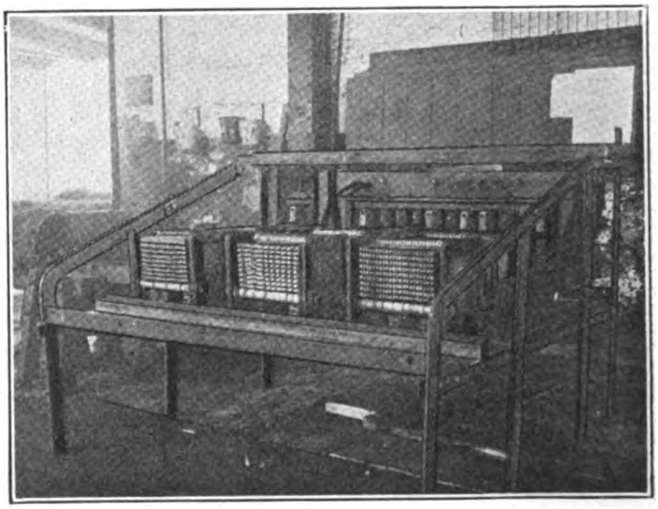
SOME RAPID PIPE THREADING

Among other recent time-savers is a double pipe-threading machine, which has been provided with an electric motor drive. This is installed in the air brake shop, where it is used for threading brake pipe, as well as conduit for use in rewiring cars, a job which is under way near by.

The spindles of the threading machine are geared to run at 75 r.p.m. and an inch of thread can be cut in about 6 seconds on a 1-in. or ⅞-in. pipe. The thread cutting dies kept normally in the machine are those for the two most commonly used sizes of pipe, so that a pipefitter who needs a piece of pipe threaded can do this work with a minimum of time and effort.



THIS MACHINE SORTS PAPER TICKETS AND COINS BY MEANS OF A ROTATING PERFORATED DRUM AND A CENTRIFUGAL FAN



SLIDING FRAME USED IN MOUNTING CONTROL APPARATUS ON ELECTRIC LOCOMOTIVE. ROLLERS STILL TO BE ATTACHED

SUMMARY OF CASH SAVED BY THE RECLAMATION DEPARTMENT FOR THE YEAR 1920 AND PART OF 1921

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Electric equipment:														
Armature parts	$307.32	$124.50	$158.12	$219.29	$28.56	$172.70	$160.07	$54.68	$201.37	$281.12	$313.77	$174.19	$126.28	$193.40
Gear cases	732.52	911.96	626.69	903.14	1,498.35	1,447.79	1,220.99	1,322.35	742.91	2,199.67	1,490.04	1,122.91	1,952.66	1,422.25
Motor shells	....	715.00	615.00	830.00	345.00	865.00	1,015.00	1,885.00	745.00	335.00	260.00	624.50	130.00	390.00
Motor caps	20.79	36.96	25.41	6.93	16.17	20.79	13.86	13.65	35.72	44.16	11.55	56.75	3.60	9.00
Miscellaneous electric	8.77	....	71.85	40.33	65.54	148.59	52.93	34.78	136.79	145.44	146.26	223.42	156.88	65.69
Brakes:														
Air brake and compressor	69.70	....	....	9.61	35.91	55.89	55.90	14.74	111.67	64.02	176.30	91.20	123.49	15.51
Air tank and valves	35.30	....	....	....	....	72.00	36.00	177.90	140.75	224.67	70.60	143.87	19.40	5.12
Brake levers and miscellaneous	72.73	7.05	28.50	66.25	18.29	65.40	83.48	73.58	165.32	330.22	357.03	340.54	566.31	295.34
Car body:														
Seats, doors, steps, etc	416.46	....	47.38	137.58	118.48	272.85	224.72	239.60	301.96	514.37	432.52	439.17	269.42	565.13
Truck:														
Truck frames	1,592.00	2,982.00	4,176.00	2,500.00	4,176.00	4,156.00	2,926.00	2,102.00	1,648.00	1,037.00	1,490.00	4,116.00	1,754.00	6,502.00
Truck miscellaneous	33.85	24.85	285.32	495.21	70.73	164.57	271.33	261.73	436.78	568.25	1,054.90	787.65	868.43	460.77
Track:														
Track and service equipment	52.25	....	25.00	25.00	21.00	64.00	24.00	32.20	9.00	13.50	77.35	73.05	89.25	710.43
Tools:														
Tools and equipment	20.00	2.10	14.00	5.00	9.95	8.00	8.50	5.60	5.00	12.50	38.05	22.20	21.05	37.05
Miscellaneous welding and cutting with gas	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Castings and forgings	113.10	310.69	299.66	251.28	329.87	818.81	838.21	714.19	759.34	813.66	448.64	395.75	618.46	789.84
Total	$3,474.79	$5,115.11	$6,372.93	$5,489.62	$6,733.85	$8,332.39	$6,930.99	$6,932.00	$5,439.61	$6,583.58	$6,367.01	$8,611.20	$6,689.23	$11,461.53

1920—Grand total.. $76,383.08
1920—Average saving per month........................... 6,365.25

Date..

INTERNATIONAL RAILWAY COMPANY
MECHANICAL DEPARTMENT

CAR RECORD

Date out of shop..............................
Car No..............................
Height rail to first step..............................
Height step to platform..............................
Height platform to floor..............................
Air brake..............................
Air compressor..............................
Style lifeguard..............................
Style trolley base..............................
Style headlight..............................
Style trolley catcher..............................
Style signs..............................
Style seats..............................
Style upholstering..............................
Style registers..............................
Style sander..............................

System painting..............................
Control..............................
Circuit breaker..............................
Fuse box..............................
Heaters..............................
No. lights..............................
Type motors..............................
No. of motors..............................
Gear ratio..............................
Diameter of wheels..............................
Type trucks..............................
Wheelbase..............................
King bolt centers..............................
Seating capacity..............................
Size of axles..............................
Total weight of car..............................

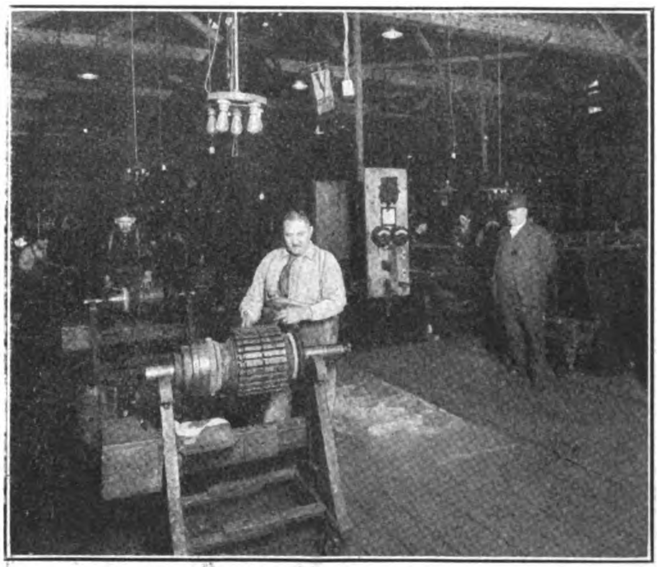
....
Inspector

INSPECTOR'S RECORD OF CAR CHARACTERISTICS

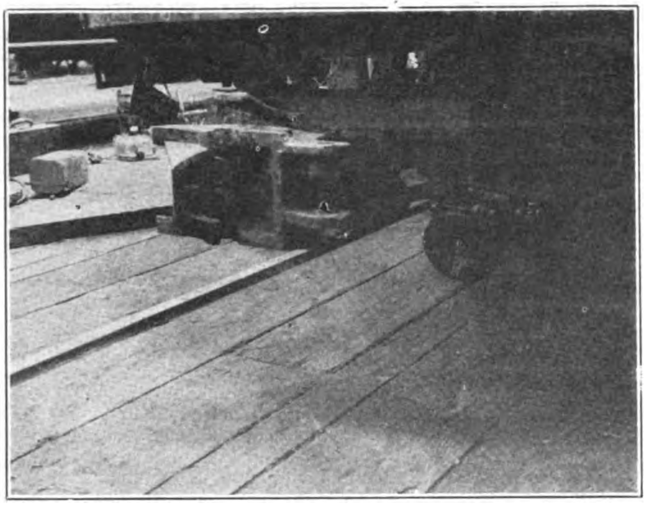
Mention of the conduit suggests that as cars go through for extensive overhaul they are being rewired in metal conduits in accordance with a systematic plan. This will be an important item in reducing car maintenance cost. In connection with this change in wiring, the jumper sockets for cars equipped to operate in trains are being mounted on the drawheads in the manner shown in one of the illustrations. This not only permits the use of shorter jumpers but reduces wear on the jumpers, which was excessive when the sockets were mounted on the bumpers.

An interesting job recently put through the shop was the remodeling of one of the Lockport line freight locomotives, which has been in service many years. This locomotive has the cab in the center with a projecting hood at each end to cover the auxiliary apparatus. The air apparatus is on one end and the resistance frames and connection board are on the other. All of the resistance frames and accessories have been mounted on a framework made up of strap steel, as illustrated, the whole mounted on rollers so as to roll on rails. The photograph reproduced was taken before the rollers had been put on, but shows the resistance frames in place. This gives a portable mounting, by means of which the whole group of devices can be drawn out into the cab for inspection and repair.

Considerable study has been given to the lighting of the shops, particularly in the armature and machine shop. An arrangement which has been found entirely satisfactory is to place 500-watt nitrogen-filled incandescent lamps, 20 ft. apart each way, and about 20 ft. from the floor. These are mounted in home-made funnel-shaped tin reflectors about 2 ft. across the bottom. The effect secured is very much like daylight and except for close work no supplementary, individual lamps are required. As will be noted in the general plan, the electric shop is partitioned off from the machine shop. The partition is made of discarded car doors which were mounted in simple framing. This provides a partition



THE ELECTRICAL SHOP IS WELL EQUIPPED FOR ARMATURE WINDING AND TESTING



MOUNTING THE JUMPER SOCKETS ON THE DRAWHEADS REDUCES JUMPER TROUBLES

which is amply high to give the privacy necessary to efficient work, while at the same time the electrical department quarters are well ventilated and lighted.

In connection with the electrical shop, a feature of interest is a new testing switchboard, with a water rheostat mounted directly behind it. The rheostat consists of a wood tank, with suspended plates operated by a screw, which terminates in a handwheel on the front of the switchboard. The reclamation department is not the only one which makes use of welding and cutting apparatus. For example, in the rehabilitation job on interurban cars, mentioned earlier, it was found economical to use a gas torch in cutting out metal pieces which were scheduled for removal, such as brackets, straps, etc. These large cars are equipped with couplers which connect the air line as well as furnish mechanical coupling, although the electric lines are separate. It was found desirable to supplement the large couplers by extra drawheads to permit coupling city cars to the interurbans.

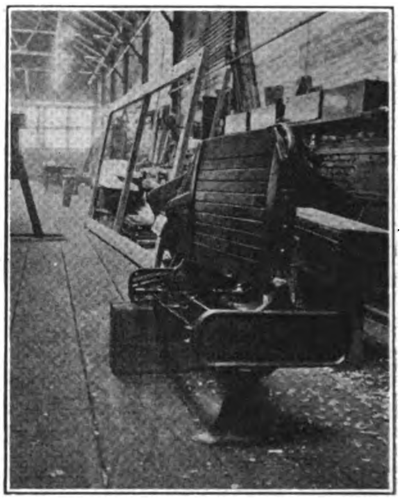
OIL BOX WELDED ON BEARING HOUSING OF OLD MOTOR

The practice of using slat seats and backs has recently been adopted. A photograph reproduced shows one of the seat backs as changed over from the cane-covered cushions formerly used.

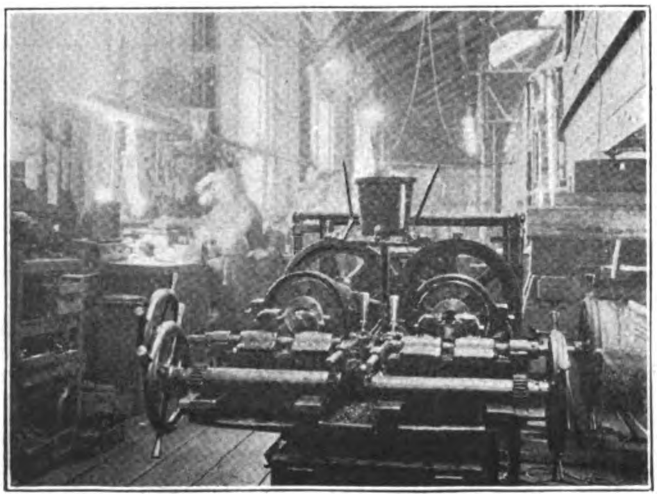
On the interurban cars also the Miller trolley shoe is used. This operates satisfactorily, but it is found that it must not be allowed to run too long so as to wear into grooves.

In the Forrest carhouse of the International Railway an ingenious jib crane has been installed to permit light repairs to be made. The crane was fabricated out of old 6-in. T-rails, two being used to form a column. The two rails for this purpose are placed side by side with heads and base reversed and bolted firmly together. The upright is set 4 ft. in a concrete floor and the upper end is secured to one of the beams forming the roof trussing. The boom, also made of two T-rails, is supported by a diagonal brace of rails below and a guy rod extending from the outer end to the upper support of the vertical column. The boom is hinged to the upright so as to give it range of action ample for the purpose for which it is used.

One of the accompanying illustrations shows a machine which has recently been developed in the shops for the purpose of separating the metal tokens and coins from paper transfers. It consists essentially of a motor-driven rotating perforated cylinder with a hopper at one end and a suction fan at the other. The perforations are just large enough to clear the largest coins, and inside are longitudinal veins which raise and drop the contents of the cylinder.



WOOD SLAT SEATS AND BACKS FOR INTERNATIONAL'S CARS



THIS MACHINE MAKES PIPE THREADING AN EASY JOB

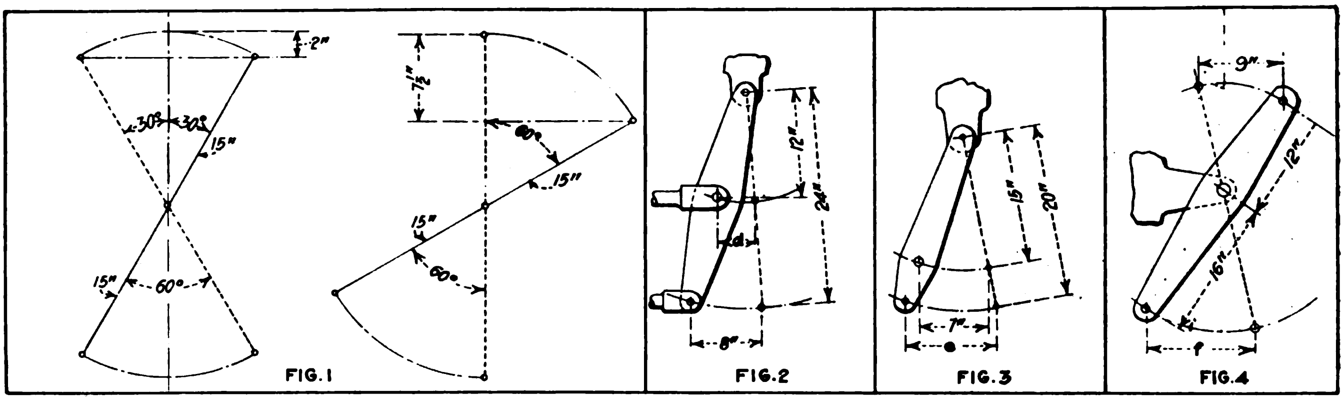
PIECE OF SPECIAL TRACKWORK REPAIRED BY ELECTRIC WELDING

Piston Travel and Shoe Clearance*

The Relation Between Piston Travel and Shoe Travel Is Determined—With a High Total Leverage Slight Shoe Wear Produces a Great Variation in Piston Travel Which Is Objectionable—Various Examples Illustrate Methods for Finding the Motion of Levers and Their Proper Release Positions

By H. M. P. MURPHY

The term "total leverage" represents the total number of pounds of brake-shoe pressure that are obtained for each pound of force exerted on the brake-cylinder push rod. Consequently it is clear that in order to obtain any desired degree of braking force or percentage of braking power on a given car, with a specified air pressure in the brake cylinder, the greater the value of the total leverage employed the smaller is the size of the brake cylinder required, and, therefore, in order to reduce the cost of installations and also to minimize the amount of compressed air used in an application of the brakes, it is always advisable to use as high a total leverage as is consistent with good practice. On the other hand a very high total leverage is objectionable because with it slight shoe wear produces a great variation in piston travel. The reason for this is explained below.



DIAGRAMS SHOWING MOTION AND POSITION OF VARIOUS LEVERS

The increase in piston travel due to the wear (or travel) of brake shoes is equal to the average amount of wear (or travel) of the shoes multiplied by the total leverage employed. For example, if in a certain brake system the average wear per shoe is 0.2 in. in a given time, and if the total leverage is 9, the increase in piston travel (due to the specified amount of shoe wear) will be equal to 0.2 × 9 = 1.8 in.

To secure the proper operation of the automatic brake, which depends largely on the relative volumes of the auxiliary reservoir and the brake cylinder, it is important to use a reasonably low total leverage and thus to maintain an approximately constant piston travel in spite of ordinary shoe wear. In steam-road service, where the cars receive attention at only long intervals and where the piston travel is not adjusted regularly, a lower total leverage is necessary than in electric railway service, where systematic inspection and maintenance can generally be relied upon. Moreover, in traction service the amount of air consumed per car would be excessive if the piston travel were long and the leverage low (a high leverage permitting the use of a small brake cylinder for a car of given weight) as brake applications are usually very frequent in such service. For these reasons it is customary to adhere as closely as possible to the piston-travel standards which have been fixed by the best practice, and which must be carefully maintained in service in order to secure satisfactory results. It is important to note in this connection that the standard piston travel should always be the average of the maximum and minimum values actually obtained.

A further reason for adhering to established standards of piston travel and braking power is that it is most essential to provide for clearance between the brake shoes and the wheels when the brake is released. Now, as there is always a certain amount of lost motion in a foundation brake rigging, the use of either a very high total leverage or an excessively short piston travel might easily result in the dragging of the brake shoes. Of course, if there were no lost motion between the push rod and the shoes the shoe clearance would be exactly equal to the piston travel divided by the total leverage. Thus, if the piston travel is 5 in. and the total leverage is ten, the shoe clearance would be five divided by ten, or ½ in. However, owing to the clearances in the pin holes and to the spring and "give" of the various parts of the rigging, the shoe clearance would actually be considerably less than this value.

Further, the piston travel obtained when a car is standing is usually an inch or two less than that obtained when a car is running, because the vibration and motion of the various parts provide for their better adjustment in the latter case. Consequently allowance should always be made for this inequality, as it is the correct "running" piston travel that must be maintained. Of course, if the brakes are applied while the train is in motion and held on till and after the stop is made and thus measured the piston travel will have the "running" value.

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*This is the sixth and last of a series of articles on forces developed in brake riggings. Others appeared in the Jan. 15, Feb. 19, March 19, April 16 and May 21 issues of this paper.

Determining the Motion and Positions of Levers

A very important consideration in the installation and adjustment of brake apparatus is the motion or travel of the various parts concerned. In dealing with this subject, the primary requirement is, of course, that the location and dimensions of all moving parts be so chosen that each lever and rod will always be unobstructed in its movements, even when the brake shoes are worn down completely and the brake-cylinder piston has traveled to its maximum limit. Otherwise the brake might easily be rendered totally ineffective. An additional requirement of good practice is that all levers, except the truck levers, should stand at right angles to their connecting rods when the brake is fully applied and the piston travel has the standard running value for the case in question. This applies particularly to the two cylinder levers. The connecting rods will thus maintain their required approximately parallel directions much more nearly than would otherwise be the case, for obviously when a lever is moved through half of a specified angle on each side of a perpendicular position with respect to the connecting rods, the resulting deflection of these rods will be much less than when the lever is moved through the same angle but not equally on both sides of the perpendicular. This is illustrated in Fig. 1.

In order to determine the travel or the position of any moving part of a brake rigging, it is merely necessary to remember that when a lever (or standard bell crank) turns about one of its three points as a center, the two other points travel in circular paths, and therefore the length of the path passed over by each of these points is in direct proportion to its distance from the center about which the lever turns.

To illustrate this principle consider the levers shown in Figs. 2, 3 and 4. In Fig. 2 the lower end point is known to travel 8 in., and consequently the distance, d, traveled by the middle point is found thus:

$$d = \frac{12}{24} \times 8 = 4 \text{ in.}$$

Again, in Fig. 3, the middle point is known to travel 7 in. and, therefore, the distance, e, traveled by the lower end point is found thus:

$$e = \frac{20}{15} \times 7 = 9\tfrac{1}{3} \text{ in.}$$

Also in Fig. 4, the upper end point is known to travel 9 in., and consequently the distance, f, traveled by the lower end point is found thus:

$$f = \frac{16}{12} \times 9 = 12 \text{ in.}$$

A general rule may now be readily stated as follows: When a lever or bell crank turns about one of its three points as a fixed center, and the travel of a second point is known, to find the travel of the third point divide its distance from the fixed center by the distance of the second point from the fixed center and multiply this result by the known travel of the second point.

In cases where a lever has no positively fixed point, as for example a cylinder lever or a live truck lever, the problem of finding the travel of a specified point can also be easily solved by the foregoing rule if each of the two points whose travel is given by the conditions of the problem is considered in turn as being fixed. In order to illustrate this method the following examples will be given:

Let it be required to find the total travel of the pull rod, in Fig. 5, necessary to take up 1 in. of shoe clearance on each pair of wheels. The clearances of 1 in. are represented in the figure by the distances BG and EM, the position of the mechanism before the brake is set being indicated by the lines ABC, CD and DEF.

It is obvious from an inspection of the diagram that the total travel of the pull rod is equal to the travel necessary to bring the left-hand shoes against their wheels plus the travel necessary to bring the right-hand shoes against their wheels. Now, assuming that the rigging is drawn in its release position ($ABCDEF$), consider that the point E is temporarily fixed and that the pull rod is moved to the right until the left-hand shoes are brought tight against their wheels, the lever, ABC, assuming the position AGH, the rod CD moving to the position HK, and the lever DEF taking the position KEL. Then, to find the distance FL (*i.e.*, that part of the travel of the pull rod necessary to apply the left-hand shoes) it is only requisite to find the distance KD, which is, of course, exactly equal to the distance HC, and, as A is fixed point, $HC = \frac{28}{21} \times BG = \frac{28}{21} \times 1$ in. $= 1\tfrac{1}{3}$, whence $KD = 1\tfrac{1}{3}$ in. and

$$FL = \frac{21}{7} \times KD = \frac{21}{7} \times 1\tfrac{1}{3} = 4 \text{ in.}$$

The point K, instead of E, may now be considered as a fixed point (which it actually is as it cannot be moved any further to the left) and the pull rod may be moved to the right till the right-hand shoes are brought tight up against their wheels, the lever KEL assuming the position KMN. The distance LN (*i.e*, that part of the travel of the pull rod necessary to apply the right-hand shoes) being found thus, as K is now a fixed point:

$$LN = \frac{28}{7} \times EM = \frac{28}{7} \times 1 \text{ in.} = 4 \text{ in.}$$

Consequently the total travel of the pull rod is

$$FL + LN = 4 \text{ in.} + 4 \text{ in.} = 8 \text{ in.}$$

Let it be required to find the total piston travel necessary to move each of the pull rods in Fig. 6 a distance of 5 in. as shown. The release position of the rigging is indicated by the lines ABC, BE and DEF. The piston travel necessary to bring the lever DEF into the position DKL may be found by considering point C of lever ABC as a temporarily fixed point and then causing the lever ABC to assume the position GHC, for the distance EK is equal to BH, and as D is a fixed point,

$$EK = \frac{16}{36} \times FL = \frac{16}{36} \times 5 \text{ in.} = 2\tfrac{2}{9} \text{ in.}$$

whence, $BH = 2\tfrac{2}{9}$ in.

and, therefore, the piston travel (AG) required to move the left-hand pull rod a distance of 5 in. is,

$$AG = \frac{36}{20} \times BH = \frac{36}{20} \times 2\tfrac{2}{9} \text{ in.} = 4 \text{ in.}$$

about the point H, till it assumes the position MHN. a fixed point (which it actually is as it cannot be moved any farther to the right) and the cylinder push rod moved out still further till the right-hand pull rod has traveled the required 5 in., the lever GHC revolving about the point H, till it assumes the position MHN. It is now clear that the piston travel necessary to move the right-hand pull rod a distance of 5 in. is equal to GM, and as H is now a fixed point,

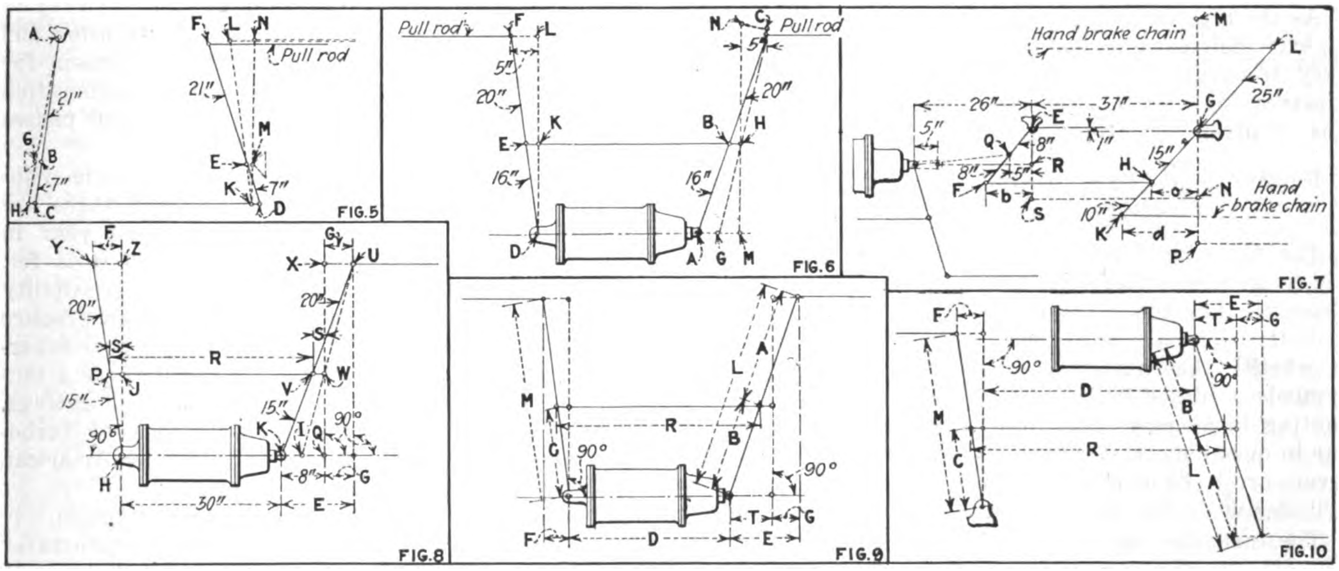
$$GM = \frac{16}{20} \times 5 \text{ in.} = 4 \text{ in.}$$

Consequently, the total piston travel required to move both pull rods 5 in. each is,

$$AG + GM = 4 \text{ in.} + 4 \text{ in.} = 8 \text{ in.}$$

DETERMINATION OF THE PROPER RELEASE POSITIONS OF LEVERS

In designing a brake rigging, the method generally preferred is to make the layout with the brakes in release position, the positions assumed by the parts concerned, when the brake is applied both with new and worn-out shoes and also when the piston travel has its maximum possible value (which is usually 12 in.), being carefully laid off, to make certain that no obstructions to the proper motion of these parts will be met. In order to accomplish this, and also to determine the release positions which the various parts should have (as well as the lengths of tie rods, etc.), so that the main levers may stand at right angles when the brake is set and the piston travel has its standard value, it is merely necessary to apply the rule previously given for the motion of levers, etc. The following examples will illustrate the general methods employed for this purpose:



TRAVEL OF PULL RODS AND POSITIONS TAKEN BY LEVERS

Let it be required to find the release positions of the two hand-brake multiplying levers applied to an electric car on which the piston travel is to be 5 in., if these levers are to stand at right angles to the center line of the car when the hand brake is fully applied. The dimensions and general location of these levers are shown in Fig. 7. The points E and G are fixed.

The first step is to draw the lines ES and MP through the points, E and G, so that they are perpendicular to the center line of the car. Next, lay off $ER = EQ$, $ES = EF$, $GM = GL$, $GP = GK$ and $GN = GH$. Then the lines ERS, SN and $PNGM$ represent the position which the rigging should assume when the brake is applied. The release positions of the levers may now be found with respect to the lines ES and MP. Let the lever ES be swung to the left till the point R has traveled the required 5 in., as shown, the lever assuming the position EQF. The distance b, which locates the release position of the lever EF, is found by aid of the rule for lever motion as follows:

$$b = \frac{16}{8} \times 5 \text{ in.} = 10 \text{ in.}$$

and as the rod SN has assumed the position FH, the lever GNP has swung into the position GHK, the distance c being approximately equal to b; that is,

$$c = b = 10 \text{ in.}$$

Consequently the distance d, which locates the release position of the lever GK, is found as follows:

$$d = \frac{25}{15} \times c = \frac{25}{15} \times 10 \text{ in.} = 16\tfrac{2}{3} \text{ in.}$$

Moreover, the proper length of the rod FH or SN should be just 37 in., as may be seen by an inspection of the figure, and the length of the chain attached to the cylinder push rod should be 26 in. minus 5 in., or 21 in. The lever LK or MP is designed to permit of the application of the hand brake from either end of the car. When the brake is applied from the right-hand end, the portion of this lever to be considered is GNP or GHK, just as if the portion GL or GM were not attached to it and when the brake is applied from the left-hand end of the car the portion to be considered is LGH or MGN, just as if the portion HK or NP were not attached to it. In either of these cases, it is evident that when a given force is applied to the hand brake chain concerned, the forces delivered to the points H and N will have the same values.

Let it be required to find the proper release positions of the cylinder levers shown in Fig. 8 so that when the piston travel is 8 in. both levers will stand at right angles to the center line of the cylinder, the total braking force and shoe clearance on each truck being the same and consequently half of the piston travel being used to apply the brakes on each truck.

First, draw perpendicular lines through the points H and Q, the latter being 8 in. (which represents the given piston travel) from the point K. The location of the center line of the connecting rod PV or JW is, of course, given by the dimensions of the levers, and the distance PJ is equal to VW. Then considering the point U as temporarily fixed:

$$PJ = VW = \frac{20}{35} \times (\tfrac{1}{2} \text{ piston travel}) = \frac{20}{35} \times 4 = 2\tfrac{2}{7} \text{ in.}$$

Next, by drawing the lines HPY and KVU, the release positions of the levers are determined, for

$$F = YZ = \frac{35}{15} \times PJ = \frac{35}{15} \times 2\tfrac{2}{7} = 5\tfrac{1}{3} \text{ in.}$$

Also,

$$G = XU = \frac{20}{15} \times QI = \frac{20}{15} \times 4 = 5\tfrac{1}{3} \text{ in.}$$

and,

$$E = KQ + G = 8 \text{ in.} + 5\tfrac{1}{3} \text{ in.} = 13\tfrac{1}{3} \text{ in.}$$

The length of the rod PV or JW must clearly be equal to the distance HK plus the piston travel; that is, $R = PV = JW = HK + KQ = 30 \text{ in.} + 8 \text{ in.} = 38 \text{ in.}$

As the type of problem illustrated by this example is an extremely common one and must, therefore, be solved very frequently, a short method for determining the distances F, G, E and R (see Figs. 8, 9 and 10) will now be given.

FORMULAS FOR DETERMINING THE PROPER RELEASE POSITIONS OF CYLINDER LEVERS

The following formulas are entirely general and apply to all cases where the total braking force and shoe clearance are the same on both trucks, whether the cylinder levers are or are not divided in the same ratio, or whether they have the same total length or not. The symbols used are indicated in Figs. 9 and 10, T representing in all cases the standard piston travel for the car in question, *i.e.*, T is the piston travel for which the levers are to be at right angles to the center line of the cylinder when the brake is set.

The formulas are:

$$G = T \times \frac{A}{2 \times B}; \quad F = T \times \frac{A \times M}{2 \times L \times C}$$

$$E = T \times \left(1 + \frac{A}{2 \times B}\right) \quad R = T + D$$

To show how the use of these formulas simplifies calculation, let it be required to solve the example given in the preceding paragraph and covering the construction of Fig. 8, where the following values are assigned to the various symbols:

$$A = 20 \text{ in.}, B = 15 \text{ in.}, L = 35 \text{ in.}, C = 15 \text{ in.},$$
$$M = 35 \text{ in.}, T = 8 \text{ in.}, D = 30 \text{ in.}$$

Substitution of the given numerical values of A, B, L, C, M, T and D in the formulas gives the desired results, thus:

$$G = T \times \frac{A}{2 \times B} = 8 \times \frac{20}{2 \times 15} = 5\tfrac{1}{3} \text{ in.}$$

$$F = T \times \frac{A \times M}{2 \times L \times C} = 8 \times \frac{20 \times 35}{2 \times 35 \times 15} = 5\tfrac{1}{3} \text{ in.}$$

$$E = T \times \left(1 + \frac{A}{2 \times B}\right) = 8 \times \left(1 + \frac{20}{2 \times 15}\right)$$
$$= 8 \times 1\tfrac{2}{3} = 13\tfrac{1}{3} \text{ in.}$$

$$R = T + D = 8 + 30 = 38 \text{ in.}$$

Thus the same results are obtained by this simple method as were found by the long process previously employed.

Progress in Prime Mover Design and Practice

N. E. L. A. Committee Returns a Bulky Report Indicating the Recent Improvements and Standardizations Effected in Power Generation

LAST week a brief report of the National Electric Light Association convention, held at Chicago from May 31 to June 3, was printed together with an abstract of the report of the committee on steam railroad electrification. The committee on prime movers, of which N. A. Carle is chairman, produced a masterful and inclusive compilation on practices and tendencies in steam power generation. The committee has not duplicated the efforts of other societies but has co-operated with them.

The report comprised more than 350 pages nearly as large as the pages of this paper. The function of this committee was stated to be "to investigate and report developments in the design, installation and operation of prime movers and accessory equipment for the production of power from fuel for the generation of electricity." The report covered the several phases of the subject as summarized below:

In steam turbines the maximum size of single-cylinder units is still limited to 45,000 kw., and there has been no appreciable change during the past year in steam pressures and temperatures, although it is felt that higher pressures and temperatures are a possibility for future application. The trend of European practice seems to be toward definitely higher speed, higher superheat and higher pressures. In addition there is a tendency to standardization of performances, ratings, tests guarantees and principal dimensions of turbogenerators. It is felt that similar action by American interests would be productive of much good.

Turbine lubrication is receiving much attention. It imposes complicated requirements on the manufacturer and the oil refiner. The committee offered for consideration a tentative general specification for turbine oils. As regards oil purification, the continuous system and the continuous by-pass system are the most effective.

The latest development in turbine foundation design is the three-point flexible suspension devised by Akimoff. Accurate static and dynamic balancing are recognized by turbine manufacturers as of prime importance. Machines which have been scientifically balanced show a marked improvement in their operation.

Manufacturers are working on the development of a closed system of generator ventilation, in which the same body of air is constantly recirculated. The basic idea is to obtain cleaner air than is possible by washing free air, and to reduce fire hazards.

In condensing equipment the regulation of the flow of circulating water to provide for seasonal variation in cooling water temperature is being considered. Such regulation would reduce power required for driving circulating pumps and avoid lowering the condensate to a temperature below that corresponding to the vacuum.

In plants whose supply of raw water is not fit for boiler feed, particular attention should be paid to condenser leakage. Where leakage is likely to be dangerous, such expedients as expanding the tubes into one or both tube sheets or using double tubes with an intermediate draining space have been proposed or adopted.

In boilers there is a tendency toward larger sizes, higher pressure and higher superheat, although 300 to 350 lb. and total temperatures of 600 to 650 deg. seem to be as high as boiler designers are willing to go at present. The continued high cost of economizers has led boiler manufacturers to develop a boiler with a higher tube bank to get at least part of the saving which could be realized with an economizer.

Improvements have been made during the year in soot-blowing equipment, which while not entirely satisfactory is generally recognized as a necessary adjunct to the modern boiler.

On horizontal-tube boilers there is a marked tendency toward the use of baffles inclined at an angle of less than 90 deg. to the tubes. This plan is readily adaptable to furnace space requirements and desired flue-gas velocities.

The larger boiler units and the higher peak ratings with consequent fluctuations in rate of steaming are giving turbine manufacturers some concern because of fluctuations in superheat and consequent fluctuations in temperature of turbine parts. Several superheater manufacturers, anticipating this difficulty, are working on the design of separately fired superheaters.

The excessive cost of high-grade coal and consequent necessity for utilizing low-grade coal have forced manufacturers of stokers to adapt designs to meet new conditions. The successful application of forced draft to chain-grate conveyor-type stokers opens up to this type a field heretofore pre-empted by the underfeed stoker.

The packing and arching-over of coal in stoker hoppers can be practically eliminated by the use of power-operated agitators installed at the base of the hopper. On the principle that the supply of coal and air is proportional to the rate of steam, several manufacturers are offering systems which control stoker speeds and the speeds of fans and other auxiliaries, through a master controller actuated by differences in steam velocities. None of these systems has been in service long enough to justify unqualified indorsement.

ECONOMIZERS AND OTHER POWER-PLANT AUXILIARIES

As to economizers, partially offsetting their high cost at present are such other considerations as excessive coal prices, high flue-gas temperatures and the improvements in economizers and fans. Relatively few changes have been made in the design of cast-iron economizers, but manufacturers of steel-tube economizers report many new developments. Considerable interest is being shown in the wrought-steel type on account of the higher boiler pressures now in use or contemplated.

Corrosion, internal and external, is the most serious problem confronting the operator of economizer equipment. It is generally agreed that where trouble is being experienced from internal corrosion some method must be used for freeing the air of dissolved gases. The remedy for external corrosion of tubes is to raise the temperature of the inlet water to the point where condensation of moisture does not take place under conditions of steady operation. Economizer leakage is another matter that requires care, especially in design and construction.

The most economical methods of maintaining heat balance in the larger stations are the house turbines in combination with a heater condenser and the straight electric drive with bleeding of the main units for feed water heating. The use of a house turbine lowers the cost of auxiliary switching equipment and reduces short-circuit current on auxiliary circuits. In general, American manufacturers of feed pumps limit pressure to 100 lb. per stage, although one is now building a single-stage pump, and in England a single-stage high pressure pump has been built for pressures around 400 lb. One pump manufacturer reports the installation of a complete plant for testing pumps with hot water under service conditions. This is a step in the right direction and should lead to beneficial results.

Practically no trouble was experienced from spontaneous combustion in coal piles during the past year, largely because coal stocks were low. As regards coal-crushing apparatus, some members of the association feel the manufacturers have developed crushers of large capacity at the sacrifice of uniformity of product. A decrease in peripheral speed of rolls would probably remedy this to some extent. Automatic coal samplers have not met with entire success on account of the difficulty of securing a representative sample.

Disposal of ashes by sluicing appears to be gaining in favor. A combination of sluicing troughs and sand pumps was reported from one plant.

LINE WELDS MUST BE MADE CAREFULLY

A few years ago line welds were considered advisable in station piping to reduce the number of flange joints, but experience gained since indicates that they may be dangerously weak unless carefully made. There are several types of butt-weld joints in which the welds are reinforced with sleeves. Such joints have proved amply strong.

As to valves, practically all stations using steam above 200 lb. have standardized on steel-body gate valves with complete monel metal trim. Both hydraulically and electrically operated valves are being extensively used, a preference being shown for the electrically operated valve with the Dean type of control. Considerable experience has developed from leaking safety valves, often due to the carrying of the weight of the bent piping on the valve body. In many cases this can be overcome by installing a slip joint close to the valve outlets.

It is hoped that a standardized color code for identifying the several types of power plant piping can be agreed upon as a result of the committee's activity along this line.

The development of new types of boiler and turbine room instruments during the past year is promising. New instruments offered by manufacturers include: (1) Recording pyrometers for indicating boiler furnace temperature; (2) combined CO_2 and CO recorders; (3) multiple-type draft gages; (4) flow meters for indicating small rates of flow of liquids under pressure, such as bearing oil or jacket water; (5) meters based on the principle of the alternating-current potentiometer for detecting condenser leakage.

EVAPORATOR EQUIPMENT ENTIRELY SUCCESSFUL

On the subject of feed water purification, a questionnaire to member companies operating evaporators for feed purification indicated that evaporator equipment is successful and provides pure water at reasonable cost. The internal use of any substances in boilers seems to be coming into general disfavor. In general it will be found more satisfactory to treat the water in a separate treating apparatus.

Developments in the field of pulverized fuel indicate a continued interest on the part of engineers in this method of burning coal. The Milwaukee Electric Railway & Light Company recently put into operation the new Lakeside plant, which will have an ultimate capacity of 200,000 kw. and which is designed for burning pulverized fuel.

Eliminating the restrictions imposed by the layout of old stations in changing over from grates or stokers to pulverized fuel equipment, the question of high boiler ratings does not seem serious. Such ratings are being obtained in new plants where boilers have ample combustion space and are designed expressly for burning pulverized fuel. The whole question of burning fuel efficiently is in process of solution and no one can foresee the ultimate end.

With respect to the burning of fuels other than coal, the committee report gives a number of suggestions regarding oil and gas burning. The burning of oil for power generation involves two economic considerations. Oil is used where it is the most efficient source of heat because of the absence of an adequate supply of cheaper fuel. It is used where such use affords a means of consuming an excess accumulation of crude oil, residues or distillates for which no other market is available.

Brake-Rod Testing

Breakage in Service of This Important Link in the Brake Rigging Is Made Improbable by the Testing of All Rods to Three Times the Stress to Which They Are Ordinarily Subjected

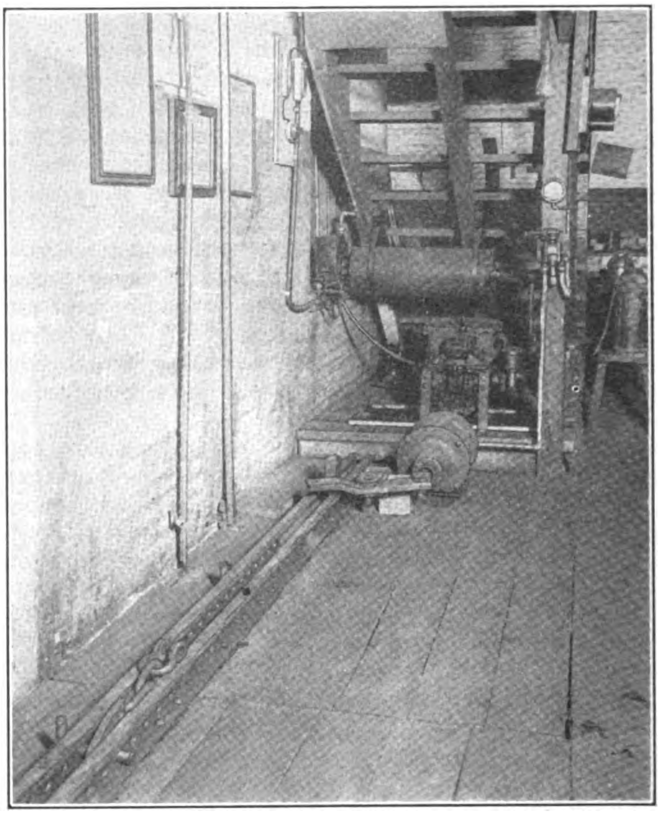
THE Washington Railway & Electric Company had two serious accidents due to breaking of air-brake pull rods, and it became necessary to give very close study to the condition and strength of the rods with a view to preventing a repetition of such occurrences. At first a test was made on all cars of the system by running the air pressure (which ordinarily is 70 lb.) up to 120 lb. and then, while the brakes were rigidly applied, rapping the brake rods sharply the whole length with a 2-lb. hammer. Several faulty rods were thus found and broken. The causes of the breaking were found to be crystallized metal, poor material and, in a few cases, improper welds. None of these causes could be located by a close inspection, as some of the welds looked perfectly good, but when broken showed the weld to be only 25 to 50 per cent good, and the poor material or crystallization showed up only when the rods were broken.

In deciding on improvements the first thing was to get some good, dependable steel for making new rods, and after several tests electric furnace steel was decided upon. This was found to be tough, ductile and easily welded. One of the tests made was to bend a piece double while cold and put it under the hammer.

The ordinary machine or soft steel which the railway had been using fractured under this test, but no amount of hammering would make the electric steel show the slightest sign of a fracture. In making new pull rods great care is taken in making welds and the metal is allowed to cool very slowly. Every completed rod before installation is put through a tension test in the special machine shown in the accompanying illustration, which was made in the company's shops for the purpose.

A separate air compressor and tank for this testing outfit were installed as the railway did not want to use the shop air line on account of the uncertainty of the air pressure being just what was wanted, namely, 100 lb. per square inch. The tank is small so as to allow the full pressure to be pumped up quickly and at the same time is large enough so when air is applied to the cylinder it does not appreciably lower the pressure.

The cylinder is 10 in. in diameter and the leverage is arranged to give 8,000 lb. pull on the brake rod under test, which is more than three times what the rod will get in service. The base to which one end of rod under test is fastened is made of two 50-lb. T-rails each 15 ft. long. The whole length of the web of these rails is drilled with 1$\frac{1}{16}$-in. holes to allow a 1-in. pin to be easily slipped through. The two rails are rigidly bolted together with the edges of the base touching, leaving a space between the ball of the rails in which a large link can be slipped and held in place with the pin. This link has a short chain, with shackle fastened to it, which is used to fasten the brake rod at that end. The other end of the brake rod is fastened to the cylinder lever. Brake rods up to 12 ft. in length can be tested on the machine. The piping between the air tank and the brake cylinder is as large as possible. An ordinary straight air brake valve is used to apply the air which is admitted directly to the brake cylinder.

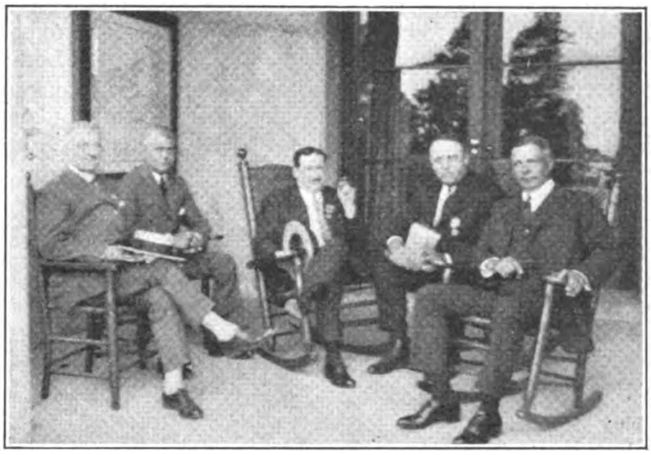


ONLY GOOD BRAKE RODS PASS THE TEST

The brake rod when under stress is rapped sharply with a hand-hammer, so as to show up any weak portions. In case a brake rod breaks under this test, a stop is provided which catches the lever, and a port in the side of the cylinder releases the air when the piston comes out beyond what it would under ordinary conditions. The pull rods on all cars passing through the general repair shops are tested on this device, and several defective ones have been found that would otherwise very likely have broken down in service and caused serious delays if not accidents.

N. Y. E. R. A. Meets at Lake George

The One Day's Session Was Devoted to Discussions on One-Man Car Operation and Taxation—Two Prepared Papers Were Presented—W. O. Wood Was Elected President for the Ensuing Year



PRESIDENTIAL GROUP AT LAKE GEORGE CONVENTION
Left to right: W. H. Collins, T. C. Cherry, J. F. Hamilton, H. B. Weatherwax and W. O. Wood.

ONE-MAN car operation and taxation occupied the attention of 250 members and guests at the thirty-ninth annual meeting of the New York Electric Railway Association, held in the Fort William Henry Hotel at Lake George on June 11. President T. C. Cherry, in speaking in his official capacity, referred first to a statement in President Harding's inaugural address that the war had left various burdens, and then listed the specific burdens which the war had left on the electric railway industry. These were: Increased floating debts, deferred maintenance, labor contracts covering unreasonably high wages, labor contracts containing burdensome working conditions, contracts for material at abnormally high costs, large investment in materials and supplies on hand, a demand for necessary capital expenditures, and loss of credit.

Fundamentally, Mr. Cherry said, electric railway transportation is a legitimate, sound business, but at present, while it is still legitimate, it is not sound, and the operators are confronted with the problem of restoring the industry to its par value. Nevertheless, it seemed to him that in the last two years the public mind has become more favorable to the industry. Instances have occurred where the city council has offered no objection to a fare higher than that stated in the franchise. This condition has been accomplished by educational work performed by operating men.

Mr. Cherry thought that the phrase "efficient operation" had been overworked. He suggested as a substitute the phrase "honest operation" and said that the manager who can effect intelligent economy in operation is performing his part in restoring the industry to its par value. Such a man can meet the employees of his property, the patrons of his road and the stockholders of his company without excuses.

Secretary-Treasurer William F. Stanton read a report covering the membership and financial situation showing the association to be in a flourishing condition in both respects.

ONE-MAN CAR OPERATION DISCUSSION PROVES STIMULATING

The introductory paper on one-man car operation was read by W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company. It is abstracted elsewhere in this issue. He was followed by W. H. Burke, Stone & Webster, Boston, Mass. Mr. Burke's paper appears in abstract on another page.

R. B. Stearns, vice-president and general manager of the former Bay State System, who was present by invitation, traced the history of the application of one-man operation on that property. He credited it largely with the recent local improvement in financial status. This property was formed of seventy or more original railways covering a territory roughly 100 by 40 miles in extent and having 940 miles of track, of which 187 has been discontinued as unprofitable. Changing conditions, including the spread of the automobile, turned it from a profitable to a non-paying property, until in 1916 operating expenses took nearly or quite the entire revenue. Economies were about to be inaugurated when the company went into receivership. Later the property was acquired at a foreclosure sale by the Eastern Massachusetts Street Railway.

The State Legislature, finally appreciating the necessity for preserving electric railway service, passed legislation permitting operation by State trustees, having comprehensive powers. Taking advantage of the opportunity thus afforded, the public trustees were able to secure some money, which was partly spent in applying one-man operation. Safety cars were purchased and old cars were remodeled, a large amount of worthless rolling-stock being destroyed.

Service with the new cars was inaugurated in the spring of 1920 and by the close of the year 250 cars were in use. In the summer of 1920 400 double-truck cars had been converted for one-man operation, and they were put into commission as soon as the labor situation warranted. Men who had operated the small cars picked the large ones when privileged to do so under the seniority rule, indicating a satisfactory attitude toward them.

Starting with the operation of these cars in September, 1920, the company rapidly increased the number in use until today 93 per cent of all of the service operated on the system is one-man; 54 per cent with double-truck and 39 per cent with Birney cars. The remaining 7 per cent comprises two-man, double-truck cars, most of which will permanently require two men for various reasons including use in two-car trains. The system is now practically "saturated" as far as one-man operation is concerned. The Birney cars weigh, with track scraper, 16,500 lb. All of the company's one-man cars have been equipped, at a cost of $80 per car, with a device for making an emergency safety stop, as is required in Massachusetts. None of these devices, as far as known, has been used by a passenger to date.

As to one-man-operation savings, Mr. Stearns said that these amount to $1,250,000 per annum. The energy saving of 16,000,000 kw.-hr. with the small cars, with coal at $10 per ton, is $240,000 and the labor saving $400,000. This is about $2,500 per car, in addition to savings in track and equipment maintenance. The large cars save $600,000 yearly. The total number of men on the payroll is now 2,400 as compared with 4,700 or more a year ago. Of the difference between the present and former operating staffs, 1,300 or more represent trainmen.

The safety cars are giving good service under widely varying conditions, former schedules are being maintained, and two-man operation is an almost forgotten idea. No difficulty is experienced with fare collection in zoned territory. The safety cars are averaging 31,000 car-miles per annum and the large cars on special runs or in tripper service 20,000 car-miles.

Mr. Stearns also spoke of the labor and fare situations on his property, which have been covered in recent issues of this paper.

ONE-MAN SERVICE ON SECOND AVENUE RAILROAD

Charles E. Chalmers, receiver Second Avenue Railroad, New York City, who has been operating this property for more than a year, told of his efforts to meet high costs by remodeling cars and operating them with one man on the East Side in that city. Having no money wherewith to purchase safety cars he is making over double-truck cars as described in a recent issue of the ELECTRIC RAILWAY JOURNAL.

As the property comprises lines operating through districts with foreign-born populations there was at first some uncertainty as to the result. The first four cars were made for either one-man or two-man operation, but as they proved popular as one-man cars later practice has been to make them straight one-man cars at a cost of $315.30 per car. This cost will be saved in one year through accident reduction alone. The Second Avenue line was first equipped and for the first five months of the year showed earning power practically equal to the two-man cars on First Avenue even when the popular open summer cars were used on the latter. Selecting a day at random, Mr. Chalmers found on June 2 that the one-man cars took in $35.97 each and the two-man cars $34.62. The present plan is to change 100 open cars to a convertible type for all year one-man service. The one-man cars are faster, also.

With average wages of 62 cents per hour on the one-man and 57 cents on the two-man cars and a ten-hour day, the former saves $364 per day for fifty cars with night service or $133,152 per year.

Karl A. Simmon, Westinghouse Electric & Manufacturing Company, the next speaker, said the present single-end standard safety car weighs 15,300 lb. and the double-end car 15,800 lb. One great advantage of the standard safety car is that it can use standard equipment, and the history of the safety car motor shows that it has been manufactured in its present form for about five years, which is a fairly long time for a motor.

Changes in motor design mean changes in the machinery for manufacturing motors, and frequent changes increase the cost of manufacture. Where protection against cold weather has been introduced in the car, its weight has got up to about 17,000 lb.

Up to the time that the weight of the car did not exceed 16,000 lb. it was what might be called a "universal" car; that is, it could be used under almost any conditions of grade, etc. Above that weight the motors might be overloaded under arduous conditions of grade, acceleration, etc., as the motor capacity would then be less than 6½ hp. per ton. The weight in different forms of transportation, per passenger carried, varies from nothing, with walking, to about 2,200 lb. per passenger seat in a Pullman car. Within these two limits will be found the most economical weight.

George H. Tontrup, National Safety Car & Equipment Company, St. Louis, said that car standardization means not only a cheaper car but that the companies could more easily finance their car purchases. It had been shown that a light car can be built as strong as a heavy car. The very early safety cars weighed less than 13,000 lb. and they are still in good operating condition. If the railway companies want to make changes in the present standard car they should decide what changes they want and then standardize on those changes.

J. C. Thirlwall, General Electric Company, said that in the addresses of Mr. Gove, Mr. Burke and Mr. Stearns the delegates had heard from the users of about one-fourth of all of the safety cars in the country and they had testified to its success. The car is now recognized as being suitable even to very congested streets in large cities, as on lower Fulton Street in Brooklyn. Mr. Stearns was pioneering with the one-man car for interurban use. The speaker then gave the facts about safety-car interurban service on the Cincinnati, Milford and Blanchester Railway, described in the issue of this paper for May 28. He told about the system of fare collection on the line, which has twenty-two zones, and said that in the four months the system has been in operation there has been no over-riding, so far as the company knows. He said he had asked the car operators if the system of fare collection used had delayed them in the operation of the cars and they had replied that it had not and they preferred it, as they were "not bothered by conductors." One-man car operation of interurban cars was in about the same status now as city operation was three or four years ago, but the speaker saw no reason why one-man cars could not be used on interurban roads, unless possibly on the most heavy routes. He urged the use of safety devices on the cars if for no other reason than to satisfy the public. He also urged the use of a light car for its reduction on power consumption and declared that on the Cincinnati line mentioned the power saving was considered as great as the labor saving. This condition of affairs would be apt to occur on other interurban lines.

DISCUSSION ON TAXATION

Ralph R. Rumery, consulting engineer of New York, then described the development of the last few years in taxation of the electric railway companies in New York State. He said that the principal state taxes were local taxes on real estate and the special franchise tax. The division of the money received from the state income tax among the various tax districts upon the basis of the assessed valuation of real property in each tax district provides an incentive to the local taxing body to increase local assessments. Certain firms of engineers are circularizing the state offering their services toward increasing corporation assessments, taking a percentage of such increases as their fee. In view of this situation, the companies should be prepared to offer evidence as to proper assessment figures. Where the local assessments of corporation property are obviously too high, he urged that the figures be brought to the attention of the Bureau of Equalization of the State Tax Commission. This bureau has a corps of engineers whose duties are to assist in the correct valuation of property subject to local assessments.

There is a movement now, he said, to substitute for the special franchise tax a tax on gross earnings, which would bear with special severity on those companies with high gross but low net receipts. Moreover, the speaker said the history of gross earnings taxes was usually a gradual increase in the percentage of the tax. In conclusion he urged greater care in calculating depreciation for inventories. He said that most companies used the straight line method and referred to numerous instances where this method had given incorrect results.

H. C. Hopson, specialist in utilities, certified public accountant, etc., New York, said that there was a great variation in the policies in the different states in regard to taxation of public utilities, particularly electric railways. This fact should be borne in mind in any comparison of wages paid or fares charged, because with taxes as high as they are at present the amount of taxes to be paid has a marked effect on the fare which must be charged and on the ability to pay wages. He listed the taxes which the electric railway companies of New York have to pay as follows: State taxes: State, county and real estate city tax; tax on special franchise; gross earnings tax; tax on dividends amounting to 3 per cent on dividends in excess of 4 per cent; mortgage recording tax. Federal taxes: net income tax on issuance of capital stock. Special taxes: paving transportation tax; tax on interest on mortgage bonds paid on behalf of bondholders to avoid withholding; tax on issuance of capital stock. Special taxes: paving tax.

He declared that if the normal federal income tax should be increased, as is proposed, to say 15 per cent, it would have a serious effect upon the companies. Heretofore they had been but little affected by the federal income tax because of the large proportion of their capital which is made up of bonds. The National Industrial Conference Board had, however, recommended that public utilities should be exempted from increased income tax, but such recommendation had received no consideration by either of the last two Secretaries of the Treasury.

Local taxes, he said, were also becoming more arduous because formerly, with local taxes, a company could argue the merits of its case, but with the present elaborate reports which have to be rendered to the state tax commission and not required from individual property owners, the utility taxes are liable to be higher in proportion to the value of the property than those of other property owners. He urged the companies to appoint a committee on taxation to look up the practice in other states and what proportion of the tax burden other businesses in New York State were bearing. He believed that such a committee would find that the railways were bearing far more than their proportion of taxes. He continued that throughout the state there was a demand for better service, but the companies cannot get money to extend their service if they have to pay anywhere near such taxes as at present. Within the last few years railway taxes have greatly increased not only actually but relatively to gross and net receipts, although the properties often were decreasing in value. This has been the case notably with the so-called paving tax. At one time the cities believed that it was necessary only to pave the main streets. Now, with existing auto traffic it is thought that many more must be paved, and the time will come soon when practically all streets on which there are tracks will be paved. He cited the case of one road near Buffalo which is fighting to take up its tracks to avoid paying for paving two-thirds of a highway which will be used exclusively for automobile competition.

SECRETARY STANTON

In conclusion he urged that so long as the railways remained in their present financial condition, they should give greater attention to accounting statements based on actual receipts and disbursements, instead of confining their attention to operating revenues and expenses, kept as they were on the accrual basis, which, when not considered in connection with other portions of the accounts, often gave an incomplete picture of the financial condition of the property.

In this connection he also urged that the executives and financial officers make a greater effort to educate the operating officials about the financial condition of their property so that the tendencies to demands by municipalities, or recommendations by operating departments for expenditures which the company could not afford, might be more readily checked.

ELECTION OF OFFICERS

At the conclusion of the discussion the following officers were elected:

President, W. O. Wood, president New York & Queens County Traction Company; first vice-president, Benjamin E. Tilton, vice-president and general manager New York State Railways, Syracuse, N. Y.; second vice-president, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company. Executive committee: W. J. Harvie, general manager Auburn & Syracuse Electric Railroad; E. J. Dickson, vice-president International Railway; A. E. Reynolds, general manager United Traction Company, Albany, and C. E. Morgan, assistant general manager Brooklyn City Railroad.

After his induction as president Mr. Wood expressed an appreciation of the honor of his election and urged that in the future the association could well take into its inner counsels the manufacturing members and those in professional capacities. The meeting then adjourned.

THE BANQUET

The concluding feature of the meeting was the annual banquet, at which President Cherry was toastmaster. He read some "fake" telegrams purporting to come from men prominent nationally, and then introduced Hon. John A. Barhite, formerly Public Service Commissioner for the Second District, New York State.

Judge Barhite said that he was pleased to be able to address unofficially the men whom he had known through his work as commissioner. The public ideas regarding these men, he said, have changed, and the railway manager is coming to be known no longer as one who is "out to do" the public. One trouble with the railways today, however, is their failure to insist fully upon enjoying the rights guaranteed them by the Constitution of the United States. They should devote more attention to explaining to the public what these rights are. The people should understand that the idea that the terms of a public service franchise are forever binding is not necessarily true, as there is a power which can change a franchise when constitutional rights are involved. It is too late, said Judge Barhite, to begin educational work when a crisis has arrived, as it is a process requiring time. There should be a constant effort to explain to the public the legal status of the electric railways.

Judge Barhite was followed by Dr. Willard Scott of Boston. His address covered the general theme of contrasts in various aspects of life and was illustrated with numerous witty anecdotes. The serious purpose of the address was to show that changes are inevitable and not necessarily to be deplored, but the problem for the individual to solve is one of adjustment or adaptation.

RAIN COMPLICATES ENTERTAINMENT PROGRAM

Outdoor sports were interfered with by inclement weather, but golf enthusiasts managed to play between showers, and many "conventionites" stayed over the week end. The ladies were well provided for with card games during the meeting, and an excellent orchestra played for dancing and general entertainment. The singing of the Manhattan Quartet during and after the banquet was greatly appreciated.

One-Man Car in Its Present Relation to Operating and Maintenance Costs*

By W. G. Gove

Superintendent of Equipment Brooklyn Rapid Transit Company

THE electric railway industry, to a greater degree perhaps than was or is the case in any other line of public utility, has since the period immediately preceding our entry into the recent world war been very generally occupied in trying to "make both ends meet." Operating and maintenance costs have mounted by leaps and bounds, taxes have been considerably increased and other burdens added, and only very recently has it seemed as though the "peak" had been reached. We are in general living in a post-war period of price and cost discussion, and although there has recently been a tendency toward lower price levels for materials entering into the maintenance of our properties, it must be kept in mind that as labor is usually a large part of the cost of producing supplies and equipment the process will be slow, as wages can be reduced only gradually. Four or five years ago most maintenance work could be considered upon a basis of 50 per cent labor and 50 per cent material cost. It has now been distorted more nearly to a 75 per cent labor and 25 per cent material basis. It is therefore obvious that the large and most important item is "labor," and it appears that we will have to face a disproportionate cost in this respect for some time to come, especially in localities where there has been no decrease in wages from the high peaks reached in 1920.

"One-man car operation" is a term with which we have become thoroughly familiar within comparatively recent years. The great step forward came through the introduction of the Birney safety car, approximately six years ago. In its production thorough consideration was given to the possibilities of reduced operating costs and with minimum weight consistent with reasonable strength. Its particularly novel feature was in provision for one-man control on a practical basis.

Its pathway of introduction was by no means easy, having been opposed by railway operators because of its diminutive proportions, by platform men through their unions because of the labor-saving qualities, and by the public because it just did not know. This combination of opposition did not apply in every instance, fortunately.

The foresight of those who devised the means of control, commonly called the safety features, contributed probably the greatest single measure to success, for it must be remembered that in the standard safety car we have a single unit with a uniform method of operation which has successfully met the operating conditions on approximately 250 different railway properties. Aside from this, in practically every instance where opposition to such operation was expressed it was on the basis of safety, and with the safety devices in evidence the opposition was overcome.

Another factor for which we are indebted to the manufacturers allied with our industry, rather than to those actually engaged in operation, is the perpetuation of standards in design. Unfortunately there is in evidence among our various properties an inclination to inject into the details of car design and construction too great a reflection of our personal views as gathered from our own property. As a matter of fact, while we are all producing and selling the same thing—street railway transportation—there was, before the advent of the safety car, practically no two lots of cars ever constructed over the same specifications, and in this practice there must have been a direct charge, for which we are responsible, to cover a tremendous range of development. Now there are in service nearly 5,000 safety cars of a single uniform type and the range of service delivered by them comprises cities of population varying from 20,000 to 2,000,000.

As to economies, it is difficult to express the items in the particular manner which might appeal to you individually. The platform saving is obvious. The track maintenance saving is prominently indicated, although I do not recall any figures on the subject. Boarding and alighting accidents are practically eliminated through the novel method of interlocking doors and steps with air brakes. Power costs are greatly reduced. It has been stated that a single safety car means a direct saving of from $1,800 to $2,600 per year, depending on the basis of comparison, and if we may presume an average of $2,000, it will be seen there is already in action a potential saving of $10,000,000 per year in our industry. Taken on any basis, the total will prove imposing.

In regard to the subject of relative sizes of cars necessary, I do not recall a single instance in the studies I have made of this subject where, with suitable track facilities, the standard safety car could not meet traffic requirements. The limit of its capacity may be directly ahead, but certainly it has not yet been attained. With the growing movement at hand looking toward the use of large cars under one-man operation, it will be possible to satisfy, at higher cost, the conditions which prohibit use of the small car.

The same principles of uniformity of equipment and operating methods and the same reasons for safety devices apply to the conversion of double-truck cars. The need is just as great, the human element equally fallible. Until recently the total number of double and single truck cars converted for one-man operation was about 700, but there has been a very decided increase in such activities, particularly in the East, and it is evident this means of effecting economy will expand greatly. I have within the last two weeks noted with particular interest the introduction of the one-man principle into the interurban service operating out of Cincinnati, Ohio, by means of single-end, double-truck cars, seating forty-seven and equipped with all standard safety devices. This operation is reasonably typical of interurban service.

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*Abstract of address at meeting of the New York Electric Railway Association at Lake George, N. Y., June 11, 1921.

Whether the rebuilding of existing cars and using existing motors of the older and heavier types is advisable depends to a great extent upon the length of time such larger cars are required for use. If required throughout the entire day the principal factor to be considered is the amount of power that will be consumed by the rebuilt cars due to their weight and larger motors as compared with new cars of the same capacity. These can no doubt be designed and constructed of considerably less weight per passenger capacity, and when equipped with new motors especially designed for the particular service will have a considerably lower power consumption.

A very few operating companies are advocating and one or two have purchased safety cars with an increased length of platform having both an entrance and an exit door. The number of points where both doors may be used to advantage, however, are so few as to make the excessive cost of construction and increased cost of power due to the added weight seem unwarranted.

The surface lines of the Brooklyn Rapid Transit System have had 206 standard Birney safety cars in operation for a year and a half. These are operated on thirty-five different lines with service varying from shuttle service, where but one car is used, to through lines, where a varying number of cars up to a maximum of twenty-one on a line is used. One of these through lines operates on lower Fulton Street in Brooklyn Borough, which is one of the most congested sections in any city in the country. These cars operate without the slightest difficulty and are interspersed with cars of both larger and heavier types at the present time.

When placing these cars in service the headway was changed on but few lines and on these lines it was shortened. With the use of the safety car fare boxes were placed in service, where on cars previously used fares were collected by the conductors. This has resulted in an increase of revenue, attributed in some cases to less stealing and in others to the fact that no fares are missed. The operators of safety cars in Brooklyn are paid an additional 5 cents an hour, so that the saving in platform costs has been on most lines 50 per cent less.

The general attitude of the public regarding the use of safety cars in New York City has been favorable and the attitude of the operators has also been generally satisfactory. No difficulty has been experienced in maintaining schedules even with the additional duration of the stops caused by the use of the safety car where full stops must always be made for both boarding and alighting passengers, where previously the cars used permitted "flying" stops as they were not fully vestibuled.

I have not given any actual data and statistics as to the weights, speed, power consumption, costs of operating, etc., of the safety car as compared with other types of cars, as no doubt these are known by you, such data having been published in the ELECTRIC RAILWAY JOURNAL and other technical publications as well as having been presented in papers that have been read during the past two or three years at the meetings of various railroad clubs.

In concluding, I wish to make plain that, at least to my way of thinking, the development of the "safety car" and the "one-man" principle has been and is one of the most promising fields for economy in our industry today and that the greatest credit is due to C. O. Birney, whose foresight and courage disregarded past practice and prejudice, and to the Stone & Webster corporation, whose faith in Mr. Birney's judgment and financial backing introduced the car first to compete with the jitney in the West and Southwest and later firmly established the car as a regular institution for general use. I also wish to point out that this is a prominent example of what can be done by active co-operation of the manufacturer, the purchaser and the operator in shaping standardization of design, which I referred to in a talk before this association a year ago. It is obvious that more prompt, complete and economical results in determining standards of design, construction and practice can be obtained for the industry than are obtained from committee work that, after all, merely scratches the ground. Members are prolific with advice for determining what others should do, but are often quick to find reasons why they cannot "practice what they preach."

I earnestly recommend to those intrusted with the operating of our properties, both within this state and elsewhere, the prompt, serious consideration of adopting and extending one-man car operation over their lines and not prejudge such as impracticable.

Development of the Safety Car*

By W. H. BURKE
Stone & Webster, Inc., Boston, Mass.

THE development of the Birney car dates back to the time when the electric railway companies under Stone & Webster management, along with practically every other company in the country, found themselves operating a lot of heavy double-truck cars weighing from 1,000 to 1,500 lb. per seat, and when only half the seats were taken, this meant unit weights of from 2,000 to 3,000 lb. per passenger.

We decided that the companies were losing a great deal of short haul traffic and also longer haul business, which could be secured and profitably handled if it were possible to develop a very light-weight car with which we could afford to operate shorter headways. Then the jitneys came along and the matter was quickly brought to a head.

The first Birney car was a double-end car seating twenty-nine people and weighing 13,000 lb., or only 450 lb. per seat. Since then, a few minor changes in design have been made. The latest design of double-end car seats thirty-two and weighs about 15,300 lb., or 480 lb. per seat. The single-end car weighs 14,500 lb. and seats thirty-five, so that its unit weight is 415 lb. per seat. However, the latest car is the same in substantially all essential details as the first car built.

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*Abstract of address at meeting of the New York Electric Railway Association at Lake George, N. Y., June 11, 1921.

Commercial operation of the Birney car was first started in Fort Worth, Tex., on Nov. 1, 1916. On that date the Northern Texas Traction Company replaced all of the two-man equipment on its Summit Avenue line with Birney cars, ten cars having been purchased for this service. By 1919 there were 1,200 of these cars in use in the United States, and by 1920 nearly 4,000. Today there are upward of 5,000 in use.

To a company contemplating one-man operation, two or three factors are of particular interest. Take first the matter of selecting and training operators. The men picked should be enthusiastic; in other words, they must be sold the one-man idea because they will have more to do than any one else in making the Birney car a success. Other requirements are alertness, adaptability and ability to concentrate. Courtesy is a prime requirement, and the men should have had a good record in two-man service. We have never followed the seniority rule in picking Birney car operators, and our experience has been that it makes little or no difference whether a man has previously been a motorman or a conductor provided he measures up to the requirements mentioned.

Here, briefly, is the plan adopted by one of our companies about a year and a half ago for training platform men, and it has worked out very satisfactorily. This company has about ninety one-man cars, 130 other city cars and forty-five interurban cars. We will assume that the man has come through the preliminaries and is reporting to an instructor to break in. For the first day he observes operation of a Birney car on the instructor's regular run. The next day they take a Birney car out on some outlying line where they won't interfere with traffic, and the student becomes familiar with the mechanical and electrical features, and learns to operate the car in a preliminary way; this covers starting, stopping, getting and keeping the car under control, taking switches, etc. This requires from three to five days.

The student next learns to operate the car on the instructor's run, and then is transferred to two-man tripper service. He first operates on the same end with the instructor and later operates each end with the instructor taking the other end. This continues until he has covered practically every city line. In this way he learns the various schedules, streets, transfer points, etc., and in fact gets a good idea of the system as a whole. Then he is O.K.'d for work, but the instructor still keeps in touch with him and helps him in every way possible.

The average breaking-in time under this plan has been 210 hours, the longest being 355 hours and the shortest 135. Under the plan formerly in force, the average time was a third longer and the man was not instructed nearly as completely as he is now. As for the older men, motormen and conductors, the company devoted two weeks last summer to breaking them in on Birney cars. Not one was disqualified by his instructor, and in only two or three cases did they quit of their own accord. This means that every platform man in this company's employ is a three-way man: he can operate a Birney car and either end of a two-man car and can do it on any line in the city. Furthermore, the matter of runs and the extra list problem are greatly simplified, and only one regular and one extra board are required for the city service.

The highest type of supervision and instruction is necessary in introducing the one-man operation, and the shop force should be instructed in maintaining the safety equipment. Usually a representative of the manufacturers will attend to this if desired. And here I want to say a word of appreciation of Mr. Beck of the Westinghouse Company and Mr. Thirlwall of the General Electric Company. They have contributed greatly to the success of the Birney car, and the industry owes them a unanimous vote of thanks.

As to the introduction of the car to the public, it is important, of course, to start it off with its best foot forward. Neither the public nor labor should get the idea that the company wants to hog all the advantages. Our companies have always shared the savings with the man through somewhat higher wages, and with the public in the way of better service.

We have never made it a practice to start one-man operation with anything but new cars of the standard Birney type. We feel that the service should be materially improved at first, except possibly in the largest cities on lines where the headways are already very short. Too much service is better than too little for a time, because it is service more than anything else that sells the car to the public. Above all, the Birney car should not be regularly overloaded. If it is, the public gets the idea that the company isn't "toting fair," and this causes dissatisfaction.

There was some labor opposition in the early days, because the men had the idea that the introduction of the Birney car meant that half of them would lose their jobs. It doesn't work out this way, of course, because the increased number of Birneys operated and the normal labor turnover will usually take care of this. In fact, I don't know of a single case where any of our companies has been forced arbitrarily to discharge any men as the result of one-man operation.

The psychology of the local public is a factor in introducing the car, and possible objections should be anticipated and met in advance as far as possible. We have found newspaper advertising of value, but believe it should be concentrated into two or three days before operation is begun. Otherwise, if there are any dissenters, it gives them just so much more time to formulate objections. Once the car is properly introduced it is its own best advertisement, and, practically without exception, we have found the press comments favorable. Some of the press comment is usually along humorous lines, and that helps, because so long as you can keep the public laughing you won't have much trouble.

As to the economics of the Birney car, the savings are very substantial. Without exception, I believe, we have found that with shorter headways earnings have shown a very substantial increase. Here are a few typical cases of the relation between increased earnings and increased mileage for a few of our companies:

	Per Cent Increase in Mileage	Per Cent Increase in Earnings
Tampa—one line	29	13
Tampa—one line	51	51
El Paso—one line	48	50
El Paso—one line	40	36
Houston (heavy jitney competition)	70	40
Tacoma—one line	20	25
Tacoma—one line	75	42
Tacoma—one line	3	17

We feel that it is very conservative to assume an increase in earnings and mileage at the ratio of 1:2, that is, with 30 per cent more mileage we will get 15 per cent more gross. No increase would be expected, of course, where headways are two or three minutes with two-man cars and, therefore, short enough to get all the business there is.

The most obvious savings in expense are in platform labor and power. There is also a saving in maintenance, but until the Birney car is older it is impossible to say definitely what it will be in the long run.

There is a marked reduction in accidents in substantially all cases; step accidents are virtually eliminated. An analysis of our companies for the first five months of 1920 show the following results:

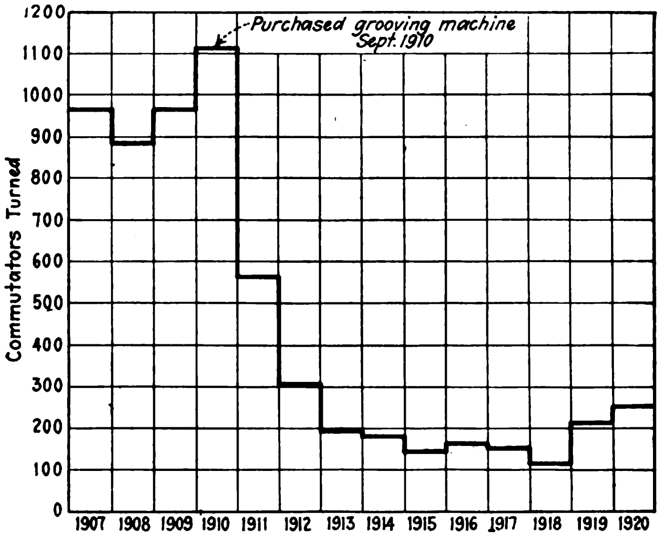
	One-Man	Two-Man
Car-miles operated per accident	18,100	10,800
Passengers carried per accident	88,700	73,800
Paid out in settlements for each 1,000 car-miles operated	$10.60	$15.00

As a broad proposition I think you can figure conservatively on a saving of not less than $2,500 per car per year with Birneys on a car for car exchange, and with a third more service, and the increased earnings which result the saving in net is around $3,500 per year for each Birney car purchased.

As regards the remodeling of existing equipment, we are now operating 100 rebuilt cars, quite a percentage being double truck. With Birney operation well established, we have found no objections on the part of any one to the use of rebuilt cars, and we feel that the operation of double-truck one-man cars has tremendous possibilities. After all, the step from single- to double-truck one-man operation is not as radical as the original change from two-man to Birney cars. In general, we believe that no valid objection can be raised to rebuilding double-truck cars for one-man operation if safety devices which are standard for the Birney car are used.

Slotting Increases Life of Commutators

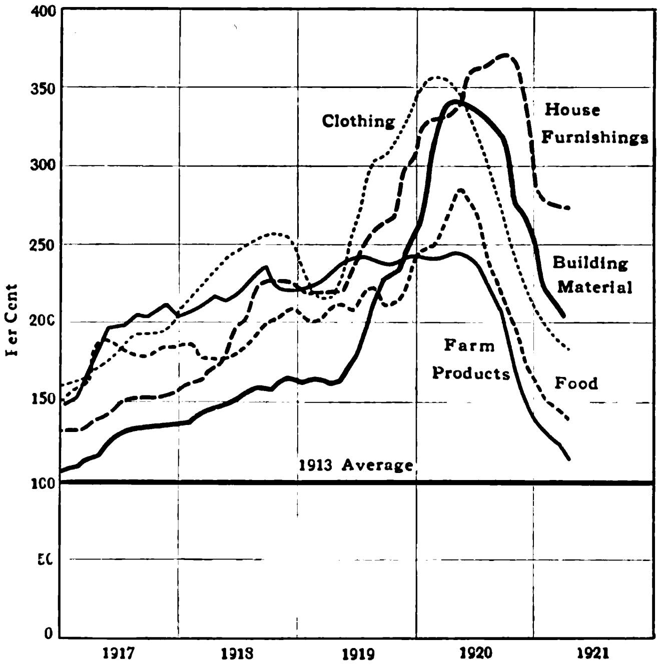
THE effect of commutator slotting in reducing the number that it is necessary to turn for flat spots, rough surfaces, etc., is very forecfully illustrated by the accompanying graph showing the number of commutators turned by the Memphis Street Railway Company. This company purchased a General Electric Company's commutator slotter in 1911 and began the work of slotting the commutators of all armatures. During the year 1911, 1,115 commutators were turned. The sudden drop in the graph after this year is very noticeable and in the year 1918 but 115 commutators were turned.



COMMUTATORS TURNED BY THE MEMPHIS STREET RAILWAY COMPANY

Cost of Living Chart

THE monthly review of the Federal Reserve Bank of New York for June 1 presents a series of interesting charts of prices, including the one reproduced, which shows wholesale prices of certain groups of commodities in the United States, expressed in percentages of the average figures for 1913. Another chart shows wholesale commodity prices in the United States and England from 1790 to date. The United States figures have three peaks, namely, about 1814, 1865 and 1920, all approximately the same height.



WHOLESALE PRICES OF CERTAIN GROUPS OF COMMODITIES IN THE UNITED STATES EXPRESSED AS PERCENTAGE OF THE AVERAGE FIGURES FOR 1913

Retail Prices of Foodstuffs Still Falling

THE United States Department of Labor through the Bureau of Labor Statistics has given out the changes in retail prices of food in nine principal cities of the United States. These changes are based on the prices of forty-three articles of food. During the month ended May 15, 1921, the retail cost of food in Bridgeport decreased 3 per cent; in Newark, 6 per cent; in New Haven, 5 per cent; in New York, 4 per cent; in Norfolk, 4 per cent; in Philadelphia, 5 per cent; in Providence, 3 per cent; in St. Paul, 8 per cent; and in Washington, 5 per cent.

For the year ended May 15, 1921, the decrease was 29 per cent in Bridgeport; 30 per cent in Newark; 31 per cent in New Haven; 29 per cent in New York; 30 per cent in Norfolk; 32 per cent in Philadelphia; 30 per cent in Providence; 37 per cent in St. Paul; and 29 per cent in Washington. For the eight-year period May 15, 1913, to May 15, 1921, the retail cost of food shows an increase of 39 per cent in Newark; 43 per cent in New Haven; 49 per cent in New York; 51 per cent in Providence; 44 per cent in Philadelphia; and 53 per cent in Washington.

The Bureau of Standards has recently issued its miscellaneous publication No. 46, describing the war work the Bureau of Standards.

Trackless Trolley Tested at Schenectady

Successful Demonstration of First Vehicle Built for the Virginia Railway & Power Company—Bus Has Seating Capacity Equivalent to the One-Man Safety Car

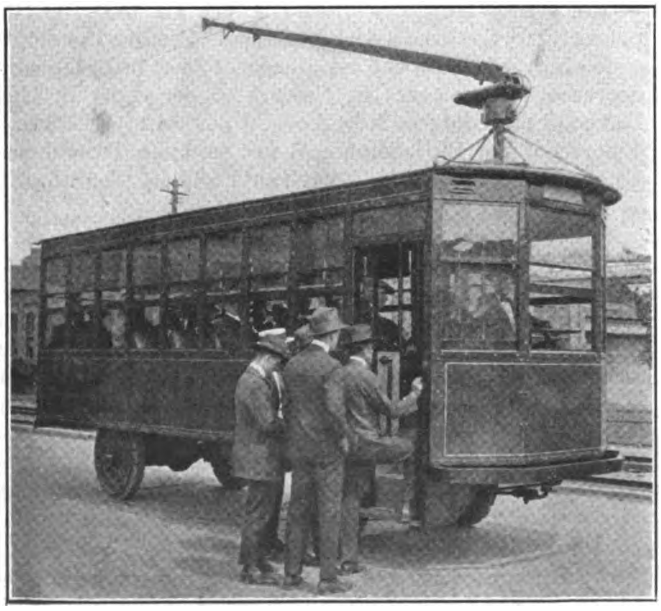
A DEMONSTRATION of the trackless trolley bus was given June 15 at the Schenectady plant of the General Electric Company, where a two-wire overhead system for the operation of this type of car was strung up over a route of about ½ mile. There were more than one hundred railway officials present to witness and participate in the demonstration, which caused much comment. The "Trollibus" operated throughout the day over a highway route having several kinds of paving, namely, brick, macadam and ordinary dirt and cinder road. The tests were declared in every respect successful. After the morning demonstration the party adjourned to the Mohawk Club, where a buffet luncheon was served.

The trackless trolley bus resembles in general size and appearance the present one-man single-truck safety car and seats thirty passengers. The equipment consists of a single railway motor and a controller arranged for foot operation. Two overhead wires on 14-in. centers supply the current, which is taken into the car by a sliding type collector, maneuvered by the motorman from his seat, and allows a leeway of 18 ft., or 9 ft. on each side, for passing other vehicles.

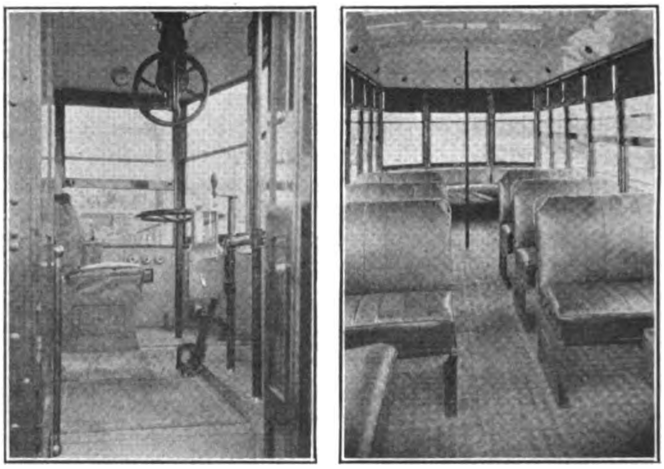
This arrangement allows two cars to operate in opposite directions on the same wire; on meeting, the operator can swing off to the side, disengage the collector or trolley pole and, after the other car has passed, can reconnect it with the trolley wire and proceed.

When running over the track area of the system; that is, in returning to the carhouse, the trolley bus is equipped with an adapter on the collector for connection with the standard overhead trolley wire and a shoe which fits into the track groove, thus giving the necessary ground connection.

The chief advantage of the trackless over the regular trolley system is the low initial capital investment. To install a single-track trolley line on an unpaved street costs about $35,000 per mile. On a paved street, where the railway company is forced to pay for the pavement between the rails and 2 ft. outside, the cost jumps to $75,000 per mile. The overhead trolley distribution system for a single trolley line costs approximately $4,500 per mile, and where a double set of trolley wires is strung the cost will be about $5,500 per mile.



GENERAL VIEW OF TROLLEY BUS, MOUNTED ON SOLID RUBBER CATERPILLAR TIRES



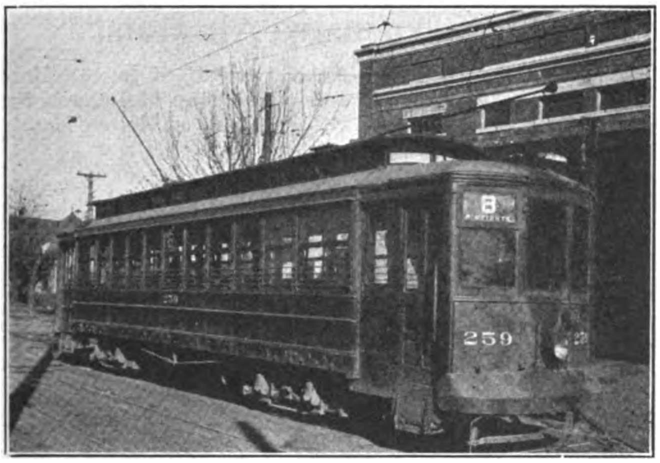
AT LEFT, OPERATOR'S COMPARTMENT, SHOWING OPERATING AND TROLLEY CONTROL MECHANISM; AT RIGHT, INTERIOR OF TROLLEY BUS, SHOWING SEATING ARRANGEMENT AND FINISH

As compared with the gasoline-driven motor bus the operating and maintenance cost is said to be much cheaper. From the standpoint of the rider, it is also claimed, it provides a service of equal reliability and comfort, and in many cases the operation is faster and smoother, especially where the streets are well paved and maintained. According to statistics given out by the General Electric Company, that portion of operating costs for gasoline and lubricating oil of the motor bus averages 5 cents per mile, whereas with the trackless trolley the cost of electricity is but 2 cents a mile. The maintenance of equipment, including tires, averages 9.5 cents per mile for the motor bus, as compared with 4 cents for the trackless trolley. Depreciation on the gasoline bus averages 3.4 cents per mile as compared with 1.9 cents for the trackless trolley. The saving in favor of the trackless trolley is therefore 10 cents per bus-mile. Figuring that the average bus runs 33,000 miles per year, this means a saving of $3,300. The first cost of a trackless trolley installation is higher than a gasoline bus, due to the overhead construction required. Interest, depreciation and taxes on this investment reduces the annual savings from $3,300 to from $2,500 to $2,700 per bus in service.

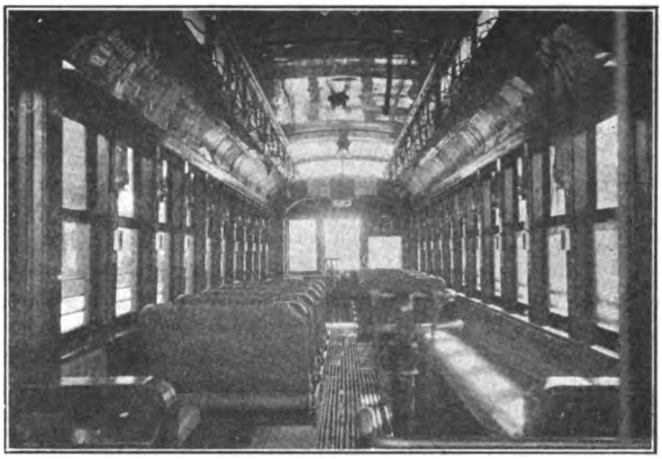
Following the tests at Schenectady a large installation is expected at Richmond, Va. Installations are also expected to be made at Staten Island, New York, Buffalo, N. Y., and other cities.

Trackless trolley cars have been in successful operation in some European countries for several years. One hundred miles of trackless system is in use in England, and in Italy several companies are operating over 40 miles of route.

Cars of this type are not new to the United States, but at present none is, so far as can be learned, in use. The general purpose of this car is not to supplant or take the place of the ordinary rail system for the business districts or thickly settled sections of a city, but to make it possible to operate trolley cars in suburban sections where the cost of laying and maintaining rails and ties would make the extension of lines impracticable.



EXTERIOR VIEW OF REBUILT CAR



INTERIOR OF CAR, SHOWING SEATING ARRANGEMENT

Little Rock Joins in Rebuilding Cars

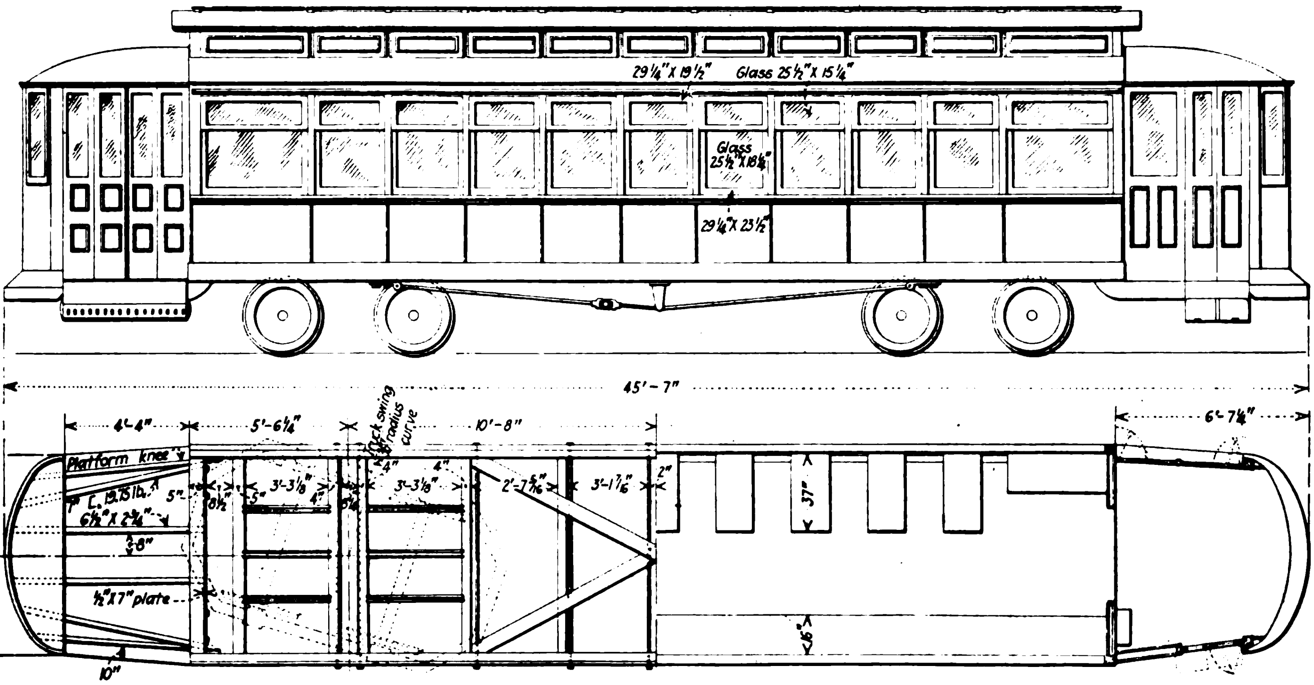
Old Summer Cars Are Made Available for All-Year Round Service—Increased Safety of Inclosed Cars Is a Factor Entering Into the Decision to Rebuild

THE Little Rock Railway & Electric Company has joined the movement of inclosing some of its summer cars in order to make them available for all-year round service. While some railway men who live in northern climes probably imagine that Arkansas is in the sunny South, where open cars may be used eight or nine months a year, the fact is that four months' service is about all that can be obtained from open equipment in that part of the country. Also, the Little Rock Railway & Electric Company has on an intensive and continuous safety campaign and it was decided that closed cars were very much safer than open cars; this was one element which entered into the decision to inclose some of these cars.

The cars which were chosen to be rebuilt were six fourteen-bench side running board cars which had been on hand for some time. Everything above the floor level was torn out except the sills and roof. The cars were cut off at the corner posts and new platforms were put on; these were 6-ft. platforms, drop extension. An accompanying illustration shows the supporting structure for these platforms. The old posts were built up by the addition of necessary strips to take care of windows and inside finish. The windows were arranged to raise and not to lower; that is, the window of the type usual on railroad coaches was designed and built in the shop of the company.

The original cars seated seventy on the fourteen cross benches. The present car seats forty-eight only. The body was too narrow to put full cross seats on both sides, so a seating arrangement using both cross seats and longitudinal seats was adopted, as shown in the accompanying illustrations. The longitudinal seats were built in the shops of the company, but Hale & Kilburn cross seats were purchased and used. The cars were completely curtained by the Curtain Supply Company.

The original floor in the car was left, with the strips removed, and a 4-in. pine floor laid on top of the old. Strips were placed in the aisle as usual. Twenty-gage galvanized iron was used to line the car below the window sill. Sheet iron was used on the outside. The entire car, both inside and outside, is enameled. The



PLAN AND ELEVATION OF REBUILT CAR

Little Rock Railway & Electric Company has decided that enamel is the thing to use as it lasts satisfactorily in that part of the country for three years, takes less time to apply and gives general satisfaction. The experience with paint and varnish there has shown that varnish must be applied annually to keep up the finish. As a matter of fact, it is figured that there is a 50 per cent saving in painting by the use of enamel over the ordinary paint and varnish. The color used is yellow, which has superseded the former pullman green of the company which was found to change to black after a short time in service.

The cars are equipped with four GE-57 motors, K-35 control, and Brill 27-G 1 trucks. Ohio brass air sanders were added as equipment to the car, as was also Ohio brass air brake equipment. National pneumatic doors and steps are used, manually operated. It was necessary, in order to provide the required room on the platform, to provide the hand brakes with folding handles, which were obtained from the Dayton Manufacturing Company. Ten heaters, arranged on two circuits, were installed in each car. The heaters used were No. 192 manufactured by the Consolidated Car Heating Company.

These cars were 42 ft. 8 in. long originally, and as rebuilt are 45 ft. 7 in. long.

The total cost of rebuilding these cars per car was $3,000. This work was done between Sept. 15, 1920, and Jan. 15, 1921.

Characteristics of Oxyacetylene Welding and Cutting Blowpipes

THE result of an elaborate series of tests tried out by R. F. Johnston, engineer-physicist, U. S. Bureau of Standards, Washington, D. C., for the War Department on commercial apparatus for cutting and welding by the oxyacetylene process form the basis of an article in the May issue of *Mechanical Engineering*. The tests were conducted for the War Department on apparatus submitted by manufacturers for that purpose.

The general conclusions from the tests were that there was a great deal of difference between the characteristics of different designs of cutting blowpipes and that there was no make of apparatus which was equally proficient and economical for all thicknesses of metal. Further, one of the prime essentials of a good welding blowpipe is its so-called gas ratio, which should be unity. Not any of the blowpipes tested proved capable of maintaining a gas ratio of unity during welding, although the welds were probably made with greater care than is usually exercised when such work is being done.

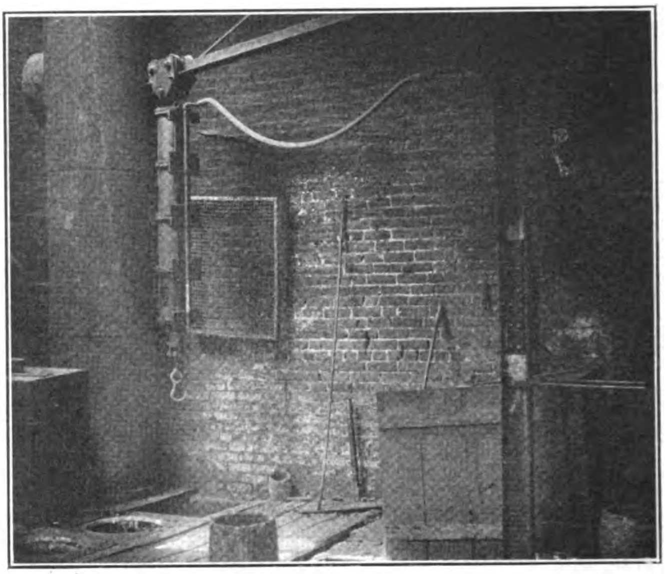
The important problem of "flashback" received extensive consideration. A blowpipe designed to be absolutely free from flashback caused by any form of obstruction, under all working conditions, will also be the eminently safe blowpipe and the one which, with ordinary care, will produce sound welds. Such a blowpipe will be so designed that, under all conditions of operation, even to a complete blocking of the gas exit at the tip end, there will be maintained a one-to-one volume delivery of each gas at identical pressures. Of the blowpipes tested, it was noted that those which were especially susceptible to flashback were the ones in which the oxygen was delivered to the blowpipe at a pressure very much in excess of that at which the acetylene was delivered.

An Inexpensive Air Hoist

Discarded 7-In. Brake Cylinders Are Used in the Brass Foundry of the Union Traction Company of Indiana for Constructing a Hoist to Lift Crucibles of Molten Metal from the Furnace to the Foundry Floor

By J. E. HESTER
Master Mechanic Union Traction Company of Indiana

THE accompanying illustration shows an air hoist constructed of four 7-in. brake cylinders and other second-hand material taken from used material stock and from the scrap pile. This is in use in the brass foundry of the Union Traction Company of Indiana and is used for handling molten metal from the furnace to the molds. In constructing this hoist the brake cylinders were lined up by fitting soft wood blocks into the ends of the cylinders. The wood blocks were 7 in. in diameter, 2 in. thick and were slightly tapered from the center to both ends. A 3-in. hole was bored in the center of the blocks to facilitate their removal after lining up and before the heads were put in place. The cylinders are bolted together with four ½-in. rods threaded at both ends to receive the necessary nuts; 1/16-in. sheet asbestos was used as gaskets at the joints between the cylinders, and to guard against the cylinders getting out of line the joints were welded with an oxyacetylene torch. The pressure head used consisted of an old discarded steam cylinder head, which was machined to fit the lower end of the cylinder. This was provided with a stuffing box and the packing gland was made from an old discarded gland.


HOME-MADE AIR HOIST

The piston consists of a head threaded to receive the lifting rod which extends through the piston and is fastened with a 1½-in. nut, which takes the strain and prevents the stripping of the threads in the head. The lifting hook used was secured from an old discarded pair of chain falls.

In the construction of the crane itself the upright member was made from a piece of old 60-lb. rail and the arm was made by bolting two pieces of ¼-in. x 3-in. x 3-in. angle iron with ¾-in. x 2-in. iron spacers placed 1 ft. apart. The arm of the crane is supported 8 ft. from the floor by means of a piece of ¼-in. x 4-in. x 4-in. angle bolted to the upright. The arm is trussed to the top of the upright member by a ¾-in. rod, which is provided with a turnbuckle. The pivot bearing at the base of the crane was made from an old discarded car center bearing, the flanges of the male portion being machined off and riveted to the upright member by means of two angle irons and the female member of the bearing being bolted to the foundry floor.

The traveler which carries the hoist consists of two sides with pins from old motor suspension bolts. The wheels used were old coal conveyor wheels bored out and babbitted where they bear on the pins.

The air used to operate the hoist is secured from a Westinghouse steam-driven air compressor located in the central power station near the shops. The air line is connected to the hoist by means of a ¾-in. hose which allows the hoist to be moved the entire length of the crane arm. The air is controlled by a two-way valve.

A New Theory of Rail Corrugation

IN RECENT issues of *Verkehrstechnik,* published in Berlin, Germany, appeared an extended article by A. Wichert of Mannheim on the subject of rail corrugation. In this he describes and discusses a new theory which he has evolved and tested experimentally. Before doing so he summarizes the theories which he found in the literature on the subject as follows: (1) The development of corrugation is favored by lack of homogeneity in the rail material due to irregularities in the rolling process; (2) corrugations are hammered into the rails under the action of rhythmical jumping of the wheels; (3) corrugations are caused by vertical vibrations of the rail; (4) corrugations are caused by "sliding vibrations" of the wheels, dampened by friction, which occur within certain critical speeds.

The new theory is based upon the setting up of "friction vibrations" which are of frequent occurrence in daily life. The action of a violin string under the bow, the creaking of a door, the sound caused by rubbing a finger along a wet window pane, the squeaking noise of wheels in a curve or of brake shoes on wheels, all involve noises caused by vibrations, due to rhythmical change in coefficient of friction. According to Mr. Wichert's theory, corrugation of rails is due to these vibrations set up under sliding of the wheels on the rails, involving change in friction coefficient, which is maximum when two surfaces in contact are at rest with respect to each other and falls off rapidly as they move with respect to each other. A factor is also the elasticity of the car axle, which acts like a spring.

Mr. Wichert explains that under actual conditions friction vibration will occur only when the wheels are sliding, as, for example, when a heavy train is starting, during braking, when a car is on a curve, etc. At the points where the wheels slide, a crowding of the material of the rail takes place, followed by the ordinary wear due to rolling. This causes a rhythmical change in the surface of the rail. Tests have, in Mr. Wichert's opinion, proved that the crests of the corrugation are considerably harder than the depressions.

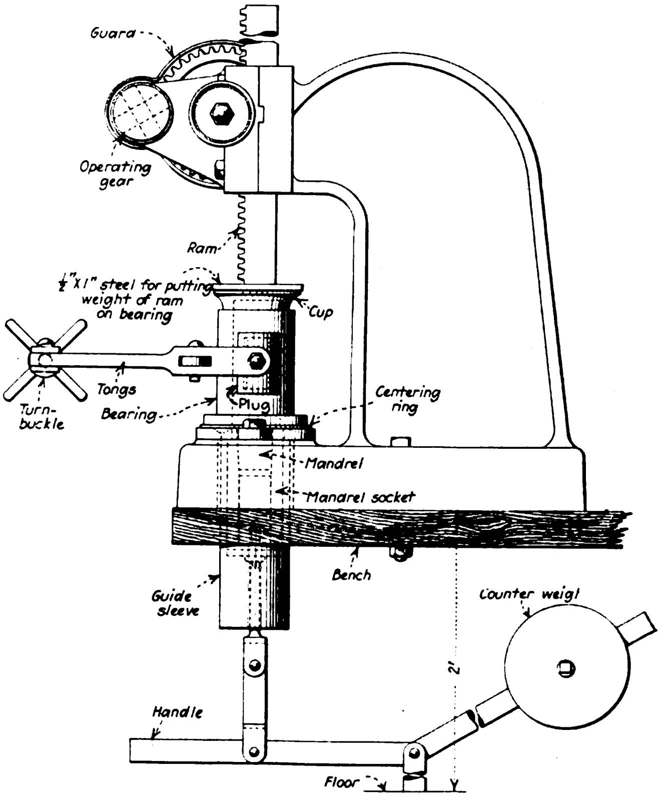
The lower and upper limits of speed at which corrugations are liable to be formed are respectively about 7½ and 17½ m.p.h. If it were possible to determine the factors controlling the speed limits, it should be possible to alter them by modifying the fctors. Mr. Wichert therefore takes up the matter of preventing rail corrugation. According to his theory the upper speed limit is set by the cessation of rhythmical gliding. If, therefore, an absolutely rigid, non-elastic axle were used, the upper limit would be at zero speed. Obviously then increase in diameter of axle should prevent friction vibrations and corrugations. Calculations and experiments show that axles 4.75 in. for a gage of 39.4 in. (1 meter), and 5.5 in. for standard gage should materially reduce the formation of corrugations. An elastic bedding of rails and ties is another safe way to cut down the possibility of developing friction vibrations. Experience has proved, Mr. Wichert says, that concreted tracks have a tendency to develop corrugations on account of their rigid foundation.

Mr. Wichert was able to check his theory experimentally by means of a special testing machine with which rail corrugations could be produced at will. It consisted of two axles, with wheels, mounted one above the other. The wheels of the upper pair were of the standard flanged type and were driven by a railway motor. The lower set, representing the rails, had special tires of rail cross-section. The lower wheels were pressed against the upper and rotated by friction with the latter. By means of levers, weights and springs the two sets of wheels could be pressed together and driven in a manner to imitate actual running road conditions.

New Armature Bearing Babbitting Press

ACCOMPANYING illustrations show a new type of armature bearing babbitting press, which is being marketed by the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y. This press is a modification of the well known type of arbor press used in machine shops quite generally, differing only in that it is geared for a ratio of 3½ to 1 in order to provide increased pressure necessary for this particular purpose.

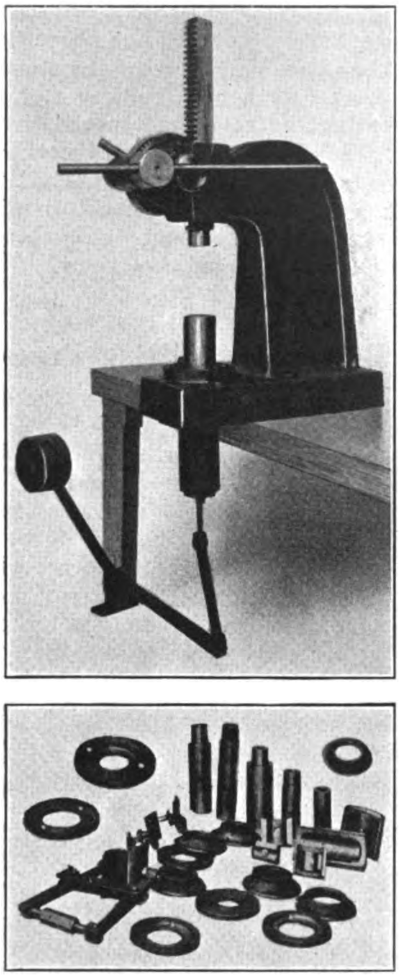
Some of the advantages which result from the use of this press in babbitting armature bearings are that as the mandrels, centering rings, pouring cups and other



ARMATURE BEARING BABBITTING PRESS

devices necessary in babbitting are a part of this machine, much time and labor are saved in that the bearing is the only part which requires handling. The press and the mold are combined, so that the babbitt lining can be poured into the small space between the mandrel and the bearing with more accuracy than with the usual hand method.

The various operations necessary in babbitting an armature bearing with the aid of this press consist of putting the mandrel in its lowered position and the bearing in place in the centering ring, with the flanged end down. The mandrel can then be raised until stopped by the shoulder of the mandrel socket. The cup, really a pouring funnel, provided to facilitate the pouring, can then be placed on top of the bearing. A strip of steel approximately ½ in. x 1¼ in. should then be laid across the top edge of the cup and the ram brought down on this with light pressure on the handle bar. The plugs for closing the openings or windows in the bearing form a part of the tongs used for handling the bearing. These can be quickly placed in position and insure that the opening will be clean and smooth so as to require no further attention after the bearing is poured. After the babbitt lining has been poured in the space between the mandrel and the bearing, the ram is raised just high enough to remove the cup and then is lowered to force the mandrel down until free. A 2 or 3-in. movement is sufficient as the mandrel has a slight taper. The additional movement required can be done rapidly by means of the counterweight lever. The counterweight provided overbalances the weight of the mandrel so that it will stay normally in the up position. In the using of this press bearings should be thoroughly cleaned and tinned, of course, and both the bearing and the mandrel must be heated sufficiently so that the babbitt will not chill before reaching the bottom of the bearing. The press was designed primarily for babbitting electric railway armature bearings, but can be used for other purposes where considerable force is required, such as the forcing of bearings in and out of housings. Its capacity is 12,000 lb.



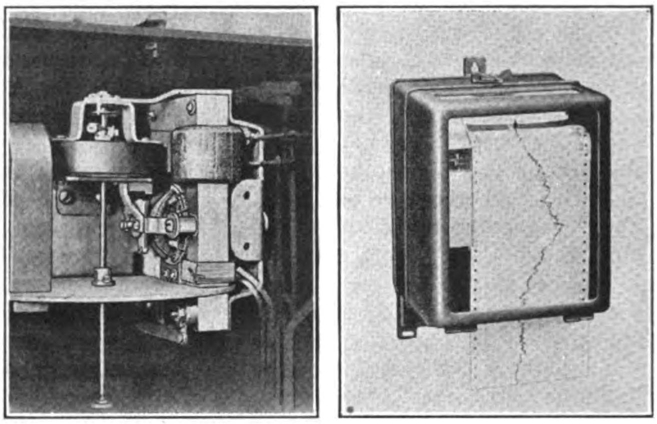
PRESS IN POSITION WITH THE VARIOUS DETAIL PARTS PROVIDED WITH THE OUTFIT

New Kilovolt-Ampere Meter

AN INSTRUMENT of the induction type, for measuring kilovolt-amperes, has been put on the market by the Esterline-Angus Company, Indianapolis, Ind. The instrument will ultimately be available in graphic, integrating, indicating and interval-demand types, but the graphic type has been developed first.

The measuring element of the new instrument is about the size of the element of a polyphase wattmeter. Each single-phase element consists of a pair of laminated poles carrying exciting windings, between which is pivoted a small armature. The armature maintains a fixed phase relation between the voltage windings.

The scale is uniformly divided throughout, and the instrument is said to be equally accurate throughout the entire range of power factor from unity to zero, either leading or lagging current. The meter records the true kilovolt-amperes of the circuit, regardless of the degree of unbalance. The three-phase instrument indicates the sum of the products of current per phase times corresponding voltage to neutral, which is the true kilovolt-amperes of a three-phase circuit.



NEW GRAPHIC KILOVOLT-AMPERE DEMAND METER—MEASURING ELEMENT OF KILOVOLT-AMPERES DEMAND METER

New Type Hand Brake

THE Minich Railway Appliance Corporation, Philadelphia, Pa., is marketing the Super-Safety Hand Brake, which consists of a vertical staff supported by a special cage. This cage is threaded to fit a nut supported by slots in this cage, so that it will move vertically. There are lugs on opposite sides of the nut which operate a U-shaped lever. A connection bar which takes the place of the usual brake chain is attached to this lever and to the brake rod. Round lugs are provided on opposite sides of the cage as a fulcrum for the U lever, so that when the staff is revolved and the nut raised the lever will revolve on these lugs and thus pull up and apply the brakes.

The fulcrum of the U lever is changed gradually as the brakes are applied, so that the power is comparatively low at the beginning, permitting the slack to be taken up quickly, but is increased toward the end of the application. Pawls are unnecessary to keep the brake applied. Some of the advantages claimed for this type of brake are that the ratchet wheel, plate, pawl, brake chain, staff, yoke and similar parts are eliminated, and as all stresses on the staff are vertical, this can be made shorter and lighter.

Letter to the Editors

"Get the Young Engineer While the Getting Is Good"

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., June 11, 1921.

To the Editors:

The editorial which appeared in the ELECTRIC RAILWAY JOURNAL on June 4, 1921, under the caption of "Get the Young Engineer While the Getting Is Good," together with the article on page 1041 entitled "Master Mechanic Proves His Worth," aroused a great deal of appreciative interest among engineers here who are interested in the development and progress of electric traction.

It is becoming quite generally recognized that there are two especially important positions on the operating staff of each reasonably sized street railway company. They are that of the master mechanic, who has charge of maintenance and upkeep of rolling stock, and that of the transportation man, who is in charge of making up and planning schedules. Either one of these men is in a position, to use the slang of the street, to make or break the railroad, assuming that other managerial problems are solved to a reasonable degree.

The article on page 1041, which demonstrates that a master mechanic proves his worth, in reality proves a very old saying, namely, "As the boss is, so are the men." If the boss is a good mechanic and instinctively is satisfied only with good mechanical workmanship, is naturally tidy and orderly in his habits and knows how to encourage and get the best out of men working with him, naturally he will keep the cars and equipment in reliable working condition at the same or lower cost than the man who is not.

To a great many men who have been in a position to observe the operating and maintenance positions as they exist and who have tried to analyze the causes and reasons why cars and equipment are not maintained better, irrespective of the pressure and necessity for reduced costs and limited pay rolls, etc., the answer seems to lie in the lack of appreciation on the part of many administrative officers of the importance and economy of paying the right kind of a salary to attract the right kind of a master mechanic. Another reason is that the industry as a whole has so neglected this phase of its problem that men have not been developed very rapidly and, as a result, very few men are available who measure up to the job of master mechanic. Another reason, perhaps, is the general lack of interest on the part of administrative officers in the matter of encouragement and personal attention to the master mechanics, the repair shop and its problems. It is in only a small percentage of street railways that the administrative officers have shown the proper interest in the shop and its problems by making frequent visits, by holding conferences with the master mechanic and considering him an important officer in the organization. There are a great many properties where the master mechanic is not called in to attend the weekly or monthly conferences of the operating staff and, as a result, there is frequently a wide difference of opinion between the transportation department and the mechanical department which results in friction, lack of co-operation, etc.

This, of course, is not true on the well-managed and well-conducted properties. It might be stated that the apparent attitude of mind toward maintenance of equipment in general on the part of many executives is about the same as it used to be a few years ago on the matter of publicity, the development of favorable public opinion, etc. The latter, however, happy to say, has undergone a decided change. Today, without doubt, there is not an administrative officer on any railway who is not alive to the necessity and importance of proper organization to handle publicity continually for the purpose of developing public good will not only among the people in the community served but also among the employees. It seems, therefore, only necessary to continue the good work you are doing in the pages of the ELECTRIC RAILWAY JOURNAL toward arousing proper interest in the matter of engineering analyses and better mechanical workmanship and general maintenance of railway equipment because, after all, there is no factor so great as that of reliable and regular service with properly maintained cars and equipment in developing and maintaining the good will of the public. Large sums spent on publicity and literature will be rendered void and negative if they are not backed up by reliable and decent service, which your article on the "master mechanic" proves can be accomplished with the right man in charge of this work.

Recently a very prominent manufacturing engineer was discussing the matter of greater refinement in the mechanical construction of locomotives, taking the position that you could not get American maintenance staffs to follow the same degree of accuracy in workmanship and maintenance as that which obtains on many European properties. In order to prove this point he asked the question, "Why is it that although every master mechanic and operating officer on electric railways knows positively that if axles, axle caps and axle bearings and housings on railway motors were properly maintained the cars would make less noise by proper maintenance of gear centers, wear and tear on gears would be appreciably less and the vibration would be reduced to a marked degree and, finally, the maintenance of the entire car and equipment would be appreciably lower, yet there are only one or two roads in the whole United States that actually do this?" It was quite difficult to answer this question. The apparent reason seems to be that they have not had any definite example proving that this is so and in the absence of the necessary spare equipment in many cases have not been able to get the cars necessary to carry out such work. Furthermore, in most cases the master mechanic is not provided with a staff capable of making any such analyses.

This brings us up to the editorial which you have written, which suggests that they get the young engineer while the getting is good. This suggestion is very timely and a very important one.

It is very encouraging to note that quite a number of young engineers who became available for such work as a result of the industrial depression have been taken over by the progressive railway operators. It is further very encouraging to have been able to see one or two reports made by these young engineers showing the errors in maintenance and upkeep that they have discovered during the first month or two of their experience. It was quite clear that the one or two things that they had already discovered would more than pay for their expense during the entire year.

As previously mentioned, it seems only necessary to agitate this subject sufficiently until all railway operators become impressed with the great value and necessity of having a well trained, technically educated—either self-educated or from college—man as a member of their operating and maintenance staff. The title of "efficiency engineer" is taboo. Most railways have called them "transportation engineers" or "equipment engineers." But their job is the important thing. It is to study transportation schedules, etc., from an engineering point of view and also to study the cars and equipment or the tools the railroad has to provide such schedules and service, making analyses each day of operating costs and time-table costs and making suggestions each month in writing to the manager of the property.

It will, of course, be necessary for the operating managers to be somewhat indulgent with these engineers for a time and go to the necessary expense to make certain tests. For example, on the question of value of maintenance of gear centers, axle bearings, etc., several cars on a given line should be specially equipped for test and then operating records should be kept for six or seven months in order to prove the value of such maintenance practice. Again, consider the matter of dipping and baking armatures and field coils. This was first introduced several years ago, but it took time to convince a great many that the expense necessary to carry this out was justified. Today there is hardly an up-to-date road that is not following this practice.

There are actually a thousand and one things of an engineering nature that can be carried out on each road which, when once established, will save thousands of dollars annually and, above all, provide better and more reliable service to the public. This, after all, is the very best publicity in which a railway operating company can indulge.

MYLES B. LAMBERT,
Manager Railway Department.

Association News

Report of Equipment Committee Put Into Shape

A TWO-DAY session of the equipment committee of the Engineering Association was held at the association headquarters in New York City, June 13 and 14. The various subcommittees presented final reports with recommendations for consideration and discussion and various details were decided for including in the final report of the committee. Those present were Daniel Durie, West Penn Railways, chairman; W. S. Adams, J. G. Brill Company; R. H. Dalgleish, Capital Traction Company; James C. C. Holding, Midvale Steel & Ordnance Company; H. A. Johnson, Metropolitan West Side Elevated Railway; T. R. Langan, Westinghouse Electric & Manufacturing Company; C. N. Pittenger, the Steubenville, East Liverpool & Beaver Valley Traction Company; E. D. Priest, General Electric Company; C. F. Scott, General Electric Company; K. A. Simmon, Westinghouse Electric & Manufacturing Company, and C. W. Squier, ELECTRIC RAILWAY JOURNAL. The committee will report on twelve subjects and already a large amount of work has been accomplished.

Schedule Committee Meets

THERE was a well-attended meeting of the joint committee on the economics of schedules at association headquarters on Wednesday, June 15. The reports of three special committees were submitted and approved. The first, covering the definition of man-hours and car-hours, was presented by Mr. Stoll; the second, on variable running time, by Mr. Moser, and the third, on methods of improving handling of traffic in congested centers, by Mr. Sullivan. It was agreed that the final draft of the report should be prepared by Mr. Dana and presented to the executive committee by July 1. It was also agreed that the full report should be presented in abstract form, only, at the convention, in order to permit greater opportunity for discussion. The names of the leaders of the discussion will be determined at an early date.

The following were in attendance: J. V. Sullivan, sponsor, Chicago Surface Lines; Edward Dana, Boston Elevated Railway, chairman; H. C. Moser, Fifth Avenue Coach Company, New York City; J. A. Stoll, United Railways & Electric Company, Baltimore; Samuel Riddle, Louisville Railway; Donald Goodrich, Twin City Rapid Transit Company, Minneapolis; A. G. Neal, Washington Railway & Electric Company; J. M. Campbell, Atlantic City & Shore Railroad, and H. A. Otis, Chicago & Interurban Traction Company.

State Utility Information Bureau Work Discussed

WITH a view to establishing closer co-operation between the State Committee on Public Utility Information and the Advertising Section of the Division of Information and Service of the American Electric Railway Association, the directors of nine state committees and Labert St. Clair of the Advertising Section conferred in Chicago on Wednesday, June 1.

It was agreed that in the future copies of all information furnished on request by the advertising section to any of the various state directors would also be sent to all of the others. The state directors also agreed to submit immediately a series of questions on their local railway problems to the association's advertising section for answer. Such answers will be distributed to all.

Mr. St. Clair reiterated previous assurances that all information regarding the electric railway industry which the association has, or which it can obtain, is at the disposal of the state committees without charge. He also explained the plan of news distribution by the Advertising Section, making it clear that the section does not concern itself with supplying material to strictly local sources, but rather with seeing that news of national importance reaches the hands of the large press associations and the larger dailies. The directors of the state committees, he emphasized, are on a preferred mailing list of the Advertising Section and every attempt is made to avoid duplication of efforts.

H. M. Davis, director of the Nebraska committee, told interestingly of his efforts to bring about closer relations between the public utility managers and the newspaper publishers in his state. He said that in the last year he had visited virtually every town in Nebraska and urged public utility managers to use display advertising space for such of their material as was not of news value. As a result of his efforts, he declared, the utilities of Nebraska spent $118,000 in display space last year.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Detroit Conferences Renewed

Fare and Purchase Questions Considered at Meeting at Which New Spirit Prevails

Following the demand of Mayor Couzens that a new fare schedule of ten tickets for 50 cents or a 6-cent cash fare be put into effect on the city lines of the Detroit United Railway, it was announced that Allen F. Edwards, vice-president of the company, and Alex Dow, newly elected director, would confer on the matter with the Eastern bankers who are interested in the company. It has been indicated by Mr. Dow that the 5-cent fare will be adopted if it is possible for the company to operate on that basis. It is understood, however, that the arrangement would be temporary pending the revision of the accounting system of the company so as to obviate the wide variance between the company and the city on figures.

At the same time the matter will be taken up with the New York men interested relative to arriving at a satisfactory price for the lines which the city plans to take over under the day-to-day agreement. These lines approximate 25 miles in length.

The Mayor's demand upon the company followed a conference of city officials with Mr. Edwards and Mr. Dow at which the engineers for the company and the city were present. The letter from Mr. Edwards in which he agreed to confer with the Mayor stated that he "hoped for a full and satisfactory discussion of the fare question." This was termed by the Mayor the most friendly communication yet received from the company.

It is held that since the reduction in wages of employees put into effect by the company on May 1 the necessity for the higher fares has passed. Action on the original injunction is asked and also an order designating the value of the rebate slips which have been issued by the company with each strip of tickets sold since the high rate was allowed. The fixing of a time limit for the public in redeeming the rebate slips is also asked.

The appraisal of the lines to be purchased by the city by city's representatives has been completed and the city auditors have also gone over the cost to the company for the lines. Only tentative figures have been arrived at and there is a wide divergence between the city and the Detroit United Railway figures on the matter of depreciation to be charged off. The city appraisers figure depreciation at 24.25 per cent. The company figures it at 5.40 per cent. Following the first conference it was announced that a further meeting would be held after the company had been allowed an opportunity to study the figures furnished by the city's appraisers. A compromise on the percentage of depreciation to be allowed is expected to result.

Arbitrators Cut Interurban Wages

Arbitrators in the wage dispute between the Cleveland, Painesville & Eastern Traction Company and the company's trainmen have decided that the men will have to accept a reduction in pay to 43 cents an hour for the first three months' service; 45 cents an hour for the next nine months, and 48 cents an hour for men in service for more than a year. The men have been receiving 55 cents, 58 cents and 60 cents an hour. Thus the men are called upon by the arbitrators to accept the offer made to them by the company.

The three arbitrators, Charles Spaulding, Painesville; Charles Currie, Cleveland and Akron, and S. D. Hutchins, Columbus, in their report said an exhaustive investigation led them to conclude that the cost of living had dropped to such an extent as to make the wage reduction justifiable. The decision also fixes the same wage for trainmen employed by the Cleveland, Southwestern & Columbus Railway as the men on this road had voted to abide by the decree of the Cleveland, Painesville & Eastern Traction Company arbitrators. The award for the Cleveland-Southwestern men is retroactive to May 1.

Arbitration in Favor of Men

The arbitration board considering the wage dispute between the Wheeling (W. Va.) Traction company and its employees has decided the scale shall not be changed for another year. The men refused to accept a proposal for a 10 per cent cut in wages made by the company. Numerous conferences were held in an effort to effect a settlement without resort to arbitration, but these being unavailing the company selected R. D. Jennison, a former executive of the Elm Grove lines, as its representative on the board. The employees authorized Thomas Kady of McMechen, a well-known labor leader, to act for them. After two or three informal meetings these two chose the Rev. R. E. L. Strider of St. Matthew's Episcopal Church as the third and neutral arbitrator. The scale which now continues for another year is as follows: For the first three months 53 cents an hour, next nine months 58 cents and after one year 61 cents.

Franchise Revision Advanced

Only Minor Details Remain to Be Arranged at Cincinnati—Fare Reduction Prospects Good

With the exception of certain minor details every demand made by the officials of the city has been conceded by the Cincinnati (Ohio) Traction Company in a redraft of an ordinance modifying the railway franchise. The minor details will probably be adjusted at a conference to be held soon and the ordinance approved so that it can be presented to the City Council for action. A public hearing on the modifications to be made in the franchise is being arranged by the Council committee on street railroads.

Under the terms of the modified ordinance the city will agree to a deferment of the payment of the franchise tax until after Jan. 1. This is merely a technicality, since the company cannot be compelled, under the terms of the existing franchise to pay the tax until it has been earned. The tax has not been earned for the year 1920 nor for the first six months of the current year and is carried on the books of the company as a deficit.

The ordinance as modified provides, however, that all surplus earnings of the company must be paid into the city treasury each quarter, beginning April 1, 1921, and must be applied to the liquidation of the back tax due to the city. There is a stipulation that the company will be permitted to defer payments into the reserve fund until the rate of fare has fallen below 7½ cents.

The franchise requires the company to create a reserve fund of $650,000. Of this amount $250,000 has been paid into the fund of the company. If the provisions of the existing franchise are insisted upon, it was said, there could be no reduction in fares until the franchise tax has been earned by the company and further until the reserve fund of $650,000 had been completed. A clause in the modified ordinance provides that if the rates of fares are not reduced on Aug. 1 and Nov. 1 the ordinance becomes null and void and the conditions of the existing franchise again become operative.

The modified ordinance further provides that children under ten years as now will be conveyed for one-half the regular rate. All children of the public and parochial schools, however, between the ages of ten and eighteen years, are to be conveyed to and from school for 5 cents.

It was announced that in order that the car riders may avail themselves of the reduced fares by Aug. 1 it will be necessary to pass the ordinance within the next ten days. Because of the referendum law the measure will not become effective until thirty days after it is signed by the Mayor and this will be just in time to permit the company to announce a reduction fifteen days before it will be operative, as is provided for by the terms of the franchise.

Amicable Agreement in Cooperstown

A new agreement was recently entered into between officials of the Southern New York Power & Railway Corporation, Cooperstown, N. Y., and a committee representing the Amalgamated Association without taking the wage matter to arbitration. The principal difference between this year's and last year's contract is that the highest rate was reduced from 45 cents to 40 cents an hour and time and one-half for overtime on the freight runs was eliminated.

The wages to be paid motormen and conductors for the next year will be as follows:

First six months—35 cents an hour.
Second six months—37 cents an hour.
Second year's service—39 cents an hour.
After second year's service—40 cents an hour.
Freight trains—2 cents additional.
Helpers—5 cents an hour under the hourly rate.
Snowplow motormen and conductors—47 cents an hour.
Operators of one-man cars—5 cents an hour over the passenger rates.

In the new contract the established policy of the company to maintain an open shop will be strictly adhered to, which means in the terms of the contract, that "each individual employee is left free to exercise his own discretion as to whether he will join a union or not." A section in the agreement allows for arbitration in the event of dispute between the company and its employees. The agreement will remain in force until June 1, 1922.

Wage Cost Must Be Reduced

W. H. Boyce, general manager of the Beaver Valley Traction Company, New Brighton, Pa., recently sent out a notice to his trainmen asking them to help out in the present extremity—to assume a part of the $93,000 loss which faces the company for the coming year. He tells the men in his circular of the various wage reductions throughout the country, and also reminds them of the company's generosity during the past three years when the men needed help in view of the increase in living costs. He adds further that it would seem that since the first of the year foodstuffs in the vicinity have decreased nearly 40 per cent and the company is asking hardly a third of that in wage reductions.

The Beaver Valley traction officials have met at various times with committees representing the men for a wage adjustment. The matter has now come to a head and the men will either have to accept the reduction, which amounts to about 7 cents an hour, or place the matter in the hands of distinterested arbitrators.

St. Louis' New Wage Contract

Old Men Continued at Former Pay—New Men Get Less—Other Conditions Modified Substantially

A new wage contract has been agreed upon by the receiver of the United Railways, St. Louis, and the carmen's union (Amalgamated) though the details especially in regard to working conditions have not been drafted finally. The entire matter must be passed upon by the United States District Court. After this has been done a digest of the terms of the agreement will be made public.

The old three-year contract expired on June 1, and the new agreement is retroactive from that date. The new contract is to run only until Jan. 1, 1922, and the pay of trainmen who were in the employ of the company on June 1 is not affected, these rates being 55 cents the first year, 60 cents an hour the second year and 65 cents the third year and thereafter. Under the new agreement new employees are to draw 50 cents an hour the first year, 55 cents the second year, 60 cents the third year, and 65 cents an hour the fourth year and thereafter.

Other employees in the carmen's union, except trainmen, were cut approximately 5 cents an hour—car placers from 48½ to 43½ cents, car cleaners from 44½ to 39½, while trackmen who were getting 49½ are to get 42; others who were getting 48 are to get 41, and some who were drawing 44 cents now are to get 35 cents an hour.

Radical modifications have been made in the working conditions in the interest of the management. Extra men called on to work are to receive pay for five hours minimum instead of eight as heretofore, and if a man is assigned to complete a regular run when a regular man gets off before completing the run the motorman or conductor who completes the run is to get only straight hourly time instead of eight hours pay as formerly, and the regular man will be allowed pay only for the actual time he puts in.

The maximum time for regular runs is set at nine hours and the minimum eight hours, with 15 minutes allowed for pulling out and pulling in. Instead of time and a half for overtime as heretofore time and a quarter will be allowed.

An important clause in the new agreement is that there shall be no arbitration in cases where conductors are discharged for stealing. These arbitration cases caused considerable annoyance and expense to the management, though there has been arbitration in only about a dozen instances among the more than 200 cases where men have been discharged for stealing since the receiver took charge of the property two years ago.

Colonel A. T. Perkins, manager for the receiver, assisted by counsel, conducted negotiations for the new contract with Frank O'Shea, one of the international vice-presidents of the union, his lawyer and a committee of trainmen. There are approximately 5,000 members of the local union. At a meeting on June 11, 4,137 of the members voted on the new contract and accepted it, 3,809 to 328. When the drafting of the document is completed this week it will go to the Federal Court.

In limiting the new contract to a period of seven months Colonel Perkins has made it plain to the employees that there will have to be a considerable reduction in pay on Jan. 1 unless the fare is raised from 7 to 8 cents or travel increases greatly. The daily receipts now are running an average of about $2,500 a day less than they were at this time last year under the same rate of fare.

The question of a fare increase is waiting on the revaluation of the property by the Missouri Public Service Commission. The inventory was completed several months ago after more than three years of labor on the part of the commission's engineers and accountants. A hearing on the findings is set for September. In the meantime the commission is allowing 6 per cent on a tentative valuation of $50,000,000. The company expects to be able to show that this is away under the true value of the property.

In passing on the wage question Colonel Perkins told the men that there are some who are overpaid, others who are drawing about what they are worth, and still others to whom he would like to pay more money. Inasmuch as injuries and damages are costing the company about $3,000 a day, it is his theory that a good trainman is worth good pay. Under the new working agreement it will be easier to get rid of the bad ones than it has been in the past.

Voluntary Acceptance of Wage Reduction

Motormen and conductors of the Citizens' Traction Company, Oil City, Pa., voted unanimously on May 18 to accept a wage reduction of 10 cents an hour. The wage scale in cents per hour from Jan. 1, 1917, to June 1, 1921, is shown in the accompanying table.

WAGE SCALE OF EMPLOYEES OF OIL CITY TRACTION COMPANY

Period	1917 Jan. 1	1917 Aug. 31	1918 March 9	1918 July 31	1919 Sept. 10	1920 April 26	1921 June 1
First six months....	..	..	..	30	41	51	41
Second six months..	..	..	..	34	43	53	43
Third six months...	..	..	..	..	45	55	45
First year.......	24	26	30	..	..	..	..
Second year.......	25	27	32	36	..	One-man operator 5c. additional	One-man operator 5c. additional
Third year.......	26	28	34	38	..		
Fourth year.......	27	29	36	40	..	..	..
Fifth year.......	28	32	..	..	..	..	..
Sixth year.......	30	..	..	..	..	..	..

Relief Program Enacted

Connecticut Legislators Come to Aid of Electric Railways by Carrying Out Governor's Recommendations

The 1921 session of the Connecticut General Assembly, which has just adjourned, was one of signal importance toward improvement of the electric railway situation in the State. Conditions have been distinctly unsatisfactory. With the Hartford & Springfield, the Danbury & Bethel and the Shore Line in the hands of the receivers and the Connecticut Company barely weathering the storm of adverse conditions aggravated by ruinous jitney bus competition, the legislators sat down with the plain evidence before them of a transportation crisis.

GOVERNOR LAKE in his inaugural message gave much attention to the problem and submitted detailed and constructive recommendations which showed his own critical investigation of the subject. He recommended, in brief, relief from the burdensome requirements of bridge construction and pavement costs levied on the trolley companies, rigid regulation of jitney buses and the granting of permission to electric railways to operate motor bus lines as connecting links or feeders to regularly maintained lines. This program was carried out by the Legislature in its entirety besides the enactment of several lesser measures all contributing to the general relief of trolley companies.

Paving requirements were covered in the passage of a bill by which companies were required to pave 8 in. on each side of the rails, making 32 in. for a single track and twice that amount for a double track. The demands heretofore have been 8 ft. 8 in. over all for single track and 19 ft. for double track.

TAX RELIEF MEASURES PASSED

By another act the highway commissioner is empowered to determine what amount electric railways shall pay toward bridge construction. Formerly one-third the cost of construction had been levied on bridges located in towns, and an indefinite contribution toward the cost of those in cities, the sum to be determined by conference and agreement. The matter now rests wholly in the hands of the highway commissioner and the arrangement is regarded as quite satisfactory to all concerned.

On the subject of taxation two important measures were passed. The first reduces the state tax levied on electric railways from 4½ per cent of gross earnings to 3 per cent of gross. A measure to make the levy on net earnings failed of passage because of the improbability of its yielding any revenue to the State. The second taxation bill enacted is designed to enable the electric railways to clean up their back taxes within six years after July 1, 1922. Interest will be charged during these years at the rate of 4½ per cent and after that date at the rate of 8 per cent. A similar arrangement of interest charges was provided in a bill covering the Connecticut Company's indebtedness of $500.000 to the State for the cost of the Washington bridge between Milford and Stratford. These measures are expected to go a long way toward re-establishment of Connecticut street railways on a dividend basis.

Perhaps the greatest single element which has militated against the best interests of efficient and paying trolley service has been the unfair and irresponsible competition of jitney buses, which have made alarming inroads upon the revenue of both rural and urban lines. The Governor dealt with the subject at length in his messsage and took an uncompromising stand for strict regulation of the jitney. Early in its session the Legislature quickly disposed of the matter by vesting in the Public Utilities Commission the power to regulate the public motor bus as regards routes of travel and to exact responsibilities incumbent upon all common carriers. The jitney problem had been previously dealt with by localities with moderate success, but in this new law authority has been centralized and the matter is in hand. Immediately upon its passage the commission began hearings on the flood of applications for licenses to operate jitney buses here and there in the State but so far it has reserved its decisions in all cases.

Another bill authorizes electric railways to operate motor buses to supplement regular electric service. This is in accordance with the Governor's recommendation. So far the Danbury & Bethel Street Railway has announced its intention of expanding its service by this means; and it is also said that the Connecticut Company has under consideration a plan for supplementary motor service on its Hartford division.

Attention of the law makers was directed to the Shore Line Electric Railway and its difficulties, with the result that legislation was effected which means the restoration of service on at least a part of the system. Measures acted upon were for the incorporation of companies to acquire the property and franchise of the old company for the purpose of operation. What service has been rendered over the system recently, it is understood, has been under lease by the Connecticut Company. Part of the road, the section from New Haven to Saybrook, was sold for junk last fall, but the purchaser was reported by Receiver Robert W. Perkins to have defaulted in his contract and the deal was terminated after some of the track had already been removed.

Labor elements made an effort to get through the Legislature a bill to do away with the one-man car. It was unsuccessful, the one-man car having pretty well established itself in the various localities where it has been introduced.

Thus that part of the Legislature's business dealing with electric railways is a fulfillment of every recommendation made by the Governor; and further, as in the case of the tax relief bills, it carries out the recommendations made to the General Assembly by the Public Utilities Commission in the report of its inquiry into electric railway conditions as authorzed under an act of the 1919 sesson. The commission's program and that of the Governor coincided largely. The former recommended that electric railways be authorized to abandon non-paying lines, but to this end no legislative action was taken. It had also suggested that no interest be charged on deferred taxes.

Not one of these bills encountered noteworthy opposition. Committees expedited their work, debates were perfunctory and the Legislature's action throughout was characterized by a unanimity of action which pointed to a realization of the urgency of these corrective measures, which now have the Governor's signature.

Franchise Surrendered in Indianapolis

The Indiana Public Service Commission has formally entered on its records that the franchise of the Indianapolis Street Railway has been surrendered. The announcement that the company would surrender its franchise was made on June 3 by Dr. Henry Jameson, president of the board of directors. City officials have understood for some time that such action was contemplated.

Two of the biggest questions resulting from the action of the company are whether the company shall continue to pay its franchise tax of $30,000 a year, and whether the company shall continue to pave between its tracks as required by the franchise which now no longer exists.

The company has refused to pay its installment of franchise tax due April 1. Under the franchise it had until June 1 in which to make the payment but it continued to refuse. Mr. Ashby has announced his intention to sue for the payment, unless an agreement can be reached. It is the contention of the city that the company should continue to pay the tax, although not legally obligated to do so.

In the matter of paving, the company has been paving between the tracks and maintaining all such pavements. It now proposes that the city shall lay the pavements and the company maintain them. The city contends that the franchise arrangement should continue.

At a conference on June 8 the city and Dr. Jameson stated their respective positions in a general way, the only definite agreement reached being that pending final settlement of the question the company will take orders from the board of public works.

Wages Cut in Salt Lake

Reduction There Averages 12½ per Cent—Saving to Company Estimated at $125,000

A decision reducing wages of employees of the Utah Light & Traction Company, Salt Lake City, Utah, an average of 12½ per cent was handed down on June 8 by the board of arbitration in the wage controversy between the company and its employees. The awards of the arbitration board and the wages the men were receiving prior to the expiration of their agreement on April 30, 1921, are as follows:

	Wage per Hour Old, Cents		Wage per Hour New, Cents
Carmen—			
First year	57		50
Thereafter	64		57
Painters—			
First grade	68		59
Second grade	59		50
Helpers	50		41
Carpenters—			
First grade	68		59
Second grade	61		52
Helpers	53		44
Welders—			
First grade	68		59
Second grade	55		46
Helpers	50		41
Blacksmiths—			
First grade	68		59
Hammer men	55		46
Helpers	50		41
Machinists—			
First grade	68		59
Second grade	55		46
Helpers	50		41
Armature winders—			
First grade	68		59
Second grade	55		46
Helpers	50		41
Electrical Department—			
First grade	68		59
Second grade	55		46
Helpers	50		41
Barnmen and pitmen—			
First grade	61		52
Second grade	55		46
Helpers	50		41
Car cleaners	50		41
Welders (nine-hour day)	$5.65	to	$5.50
Switch repairers (nine-hour day)	5.25	to	4.50
Track cleaners greasers and teamsters (nine-hour day)	4.50	to	3.65
Bonders, railcutters and yardmen (nine-hour day)	4.50	to	3 65
Trackmen, first six months (nine-hour day)	4.50	to	3.25
Trackmen thereafter (nine-hour day)			3.65

The decrease is approximately one-half of what was asked by the officials of the company, and ranges from a decrease of 11 per cent to 18.9 per cent. The decision will reduce the annual payroll of the company approximately $125,000.

The award is retroactive to May 1, 1921. It will be included as a part of the working agreement between the company and its employees for the year ending April 30, 1922. The award is in the nature of a compromise by which both the company and the employees have agreed to abide.

The wage dispute arose early in April, when the company gave notice that it desired to reduce wages when the next annual working agreement with employees went into effect on May 1. The employees opposed the reduction, and both sides agreed to place the matter before an arbitration board for settlement.

The board has been in executive session since June 3. For a week prior to that time a public hearing was held and testimony from both sides was received by the board.

In the opinion of the members of the board of arbitrators the differential between regular and temporary track employees will enable the company to do more of the much-needed work on city pavements with the money set aside by it for maintenance and repairs.

Chicago Bills Still Pending

With only five days more left of the current session the Illinois State Legislature took a recess on June 11 having before it several important measures affecting the Chicago traction companies and other utilities.

Mayor Thompson's bill for the formation of a "transportation district" and a 5-cent fare was passed by the lower House and sent to the Senate.

The new utilities act had been in the Senate for several days and had been burdened with amendments until it did not much resemble its original form. It looks as though both measures were booked for some rough sledding, with the final outcome uncertain.

Owing to the fight made on the utilities bill by down-state interests it was amended so as to apply in the "home rule" section to Chicago alone and would require signatures of 25 per cent of the voters before being submitted to a referendum. This was said to be fatal to the measure. The Senators also voted to eliminate the section which would prevent the new commission from abrogating rate contracts between companies and municipalities.

Another bill filed late in the session would permit the consolidation of elevated and surface lines. Another would allow the proposed "transportation district" an indeterminate franchise for operation of utilities. Both these measures are said to be necessary to make Mayor Thompson's scheme a success.

Two Years of Bickering Ended

Wages Cut, Fares Reduced and One-Man Cars Sanctioned at Davenport—Future Prospects Bright

With one-man cars operating in Davenport, Iowa, fares reduced, and separate wage and working agreements signed with trainmen of Iowa and Illinois, the Tri-City Railway's two years of disputing with trainmen and City Councils has come to an end. Politics, class hatred and ignorance all acted as a deterrent to the utilities there in their attempt to obtain a reasonable rate for their services.

UNDER the agreement signed by the men a wage scale of 50 cents an hour for one-man car operators and 55 cents for trainmen on two-man cars goes into effect. The previous scale was 70 cents an hour on two-man cars, and prior to June 1 there were no one-man cars in operation. The company also refused the international trainmen's union recognition, but recognized the Davenport and Rock Island-Moline locals. Agreements were signed on June 13.

A court order authorizing the operation of one-man cars in Davenport was granted in the District Court by Judge A. J. House on May 19. The railway applied for a temporary injunction a few days before, showing in statements that it was impossible to make a reasonable return on the stock of the corporation with two-man operation. It was also shown that the average return for a four-year period had been only 2 per cent.

Meanwhile the men prepared to strike on the expiration of the wage scale on June 1. B. J. Denman, president of the Tri-City Railway, had announced some months before that the wage scale would be cut from 70 cents to 40 cents an hour on that date. A strike order was issued by the locals for June 1, but withheld when negotiations were taken up with the understanding that the men should work for 40 cents an hour, but that the wage finally agreed upon should be retroactive from June 1.

For a while the company refused steadfastly to recognize the union either as an international or local. A definite date for a strike was fixed, but this was set aside at the request of Harry M. Schriver, Mayor of Rock Island. He called the traction officials and union representatives together and proposed that Frank T. Hulswit, president of the United Light & Railways Company, Grand Rapids, Mich., of which the Tri-City Railway & Light Company is a subsidiary, should be called to the Tri-Cities.

Mr. Hulswit, then in New York, found that it would be impossible to reach Davenport before the date set by the union for a strike, so he instructed President Denman to proceed with negotiations. Meanwhile Vice-President R. Schaddelee of the United Light & Railways hurried to Davenport.

In two meetings which lasted many hours the traction troubles of two years were ironed out. The scale suggested by Rock Island's Mayor was adopted, the local unions recognized, and a working agreement satisfactory to both the company and the men arrived at.

In Davenport the 9-cent fare, with three for a quarter, was reduced to an 8-cent straight rate through the approval of the use of one-man cars and it is possible that a reduction from 9 cents to 8 would follow the granting of similar privileges to the company in Rock Island and Moline. Bridge line cars which cross the government bridge from Rock Island to Davenport are continuing with two-man operation.

Because of a Socialist administration in Davenport, which made a sport of baiting the utilities, the railway was forced into the courts to obtain one-man service for that city. Several times attempts to come to an agreement with the City Council were halted at the last moment.

Hoping to "get something on" the railway and light corporation the city ordered a public audit of the company books. The accounts were promptly thrown open by the company to the auditors, who reported to the Council after several months of research. The figures completely backed up the claims of the company that it was virtually bankrupt.

In open Council meeting Henry Vollmer, ex-congressman and special counsel for the city, told the Socialist members that the companies were bankrupt and must be granted one-man service and a higher gas rate. City Attorney U. A. Schreechfield, Socialist, reiterated this statement and it seemed as though an agreement was about to be reached.

Despite this interpretation of the audit and appraisal, the Council refused to meet the company half way. A proposal for the adoption of one-man service and a reduction of fares was spurned. Unable to obtain redress from the city, the railway then took its case to the courts.

Brooklyn Wages to Be Reduced

A reduction in the wages of the employees of the Brooklyn (N. Y.) Rapid Transit Company to take effect on Aug. 6 has been determined upon by Lindley M. Garrison, receiver of the company. Mr. Garrison has sent letters to the various committees representing the employees whose wages were increased last August, asking them to get together and take up the matter and agree, if possible, on the amount of the reduction.

The receiver has sent the following letter to William S. Menden, general manager for the company:

> You will recall that in my notice to employees dated July 16, 1920, I made the most recent increase in rates of pay, practical upon an annual basis. This became effective on Aug. 6, 1920. That increase, added to previous increases, amounted to 35 per cent above the rates in effect on Aug. 1, 1919.
>
> Owing to conditions, which need not be recited, it is obvious that we can no longer continue at the present high scale. I have abstained, in view of the circumstances, from making any reductions until the lapse of a year from the time of the last increase. That year will be up on Aug. 6, 1921. The time has now come when this matter must be taken up, and I wish that you would in due course confer with the various representative bodies in order that a proper basis may be arranged for the wage scale after Aug. 6, 1921.

The so-called "representation plan" in Brooklyn was formulated by Judge Julius M. Mayer of the United States District Court in co-operation with Mr. Garrison. In November of last year the first elections were held and men who had been with the company for sixty days were allowed to vote. But it was specified that they take an oath that were not members of the Amalgamated.

The present rate of pay for motormen and conductors on the surface lines is 57, 59, 62 and 67 cents. On the elevated lines the conductors are receiving 59, 60 and 62 cents while the guards are receiving 53, 54 and 57.

Readjustment of wages has also been suggested by the officers to the men of the Interborough and the New York Railways.

Railway Man Killed in Accident—Others Injured

Spencer Vandenberg, manager of the Louisville Safety Council, died on June 14 at Norton Infirmary, Louisville, Ky., from injuries suffered Saturday when the automobile in which he was returning from a round-table barbecue ran into a tree. By the irony of fate Mr. Vandenberg was killed in an accident of the kind he was trying to educate the public to avoid.

Mr. Vandenberg was on the way home in the car of George Dehler, who asked several friends to ride with him. Mr. Vandenberg, Neil W. Funk, Frank E. Belleville, general auditor of the Louisville Railway, and John Carroll were also in the car when it ran into a tree at a sharp turn in the road near St. Matthews. Mr. Vandenberg was thrown against the tree. He suffered four broken ribs, a fractured left hip, injuries to the right leg, and cuts and bruises. It is believed that a broken rib punctured the lung and brought on pneumonia which terminated fatally.

Mr. Vandenberg went to Louisville in January from Schenectady to become manager of the Safety Council, engaged in the work of teaching the public to avoid accidents. His home was in Eastover. Mr. Vandenberg was formerly with the Schnectady Railway.

Mr. Funk is expected to recover. He is superintendent of the claim division of the Louisville Railway. He had expected to go on the C. E. R. A. boat trip. Among his injuries is a fractured hip.

Programs of Meetings

Final Arrangements for C. E. R. A. Summer Meeting

The program for the summer meeting of the Central Electric Railway Association, which will be held on board the S.S. *South American*, has been announced by Sam W. Greenland, chairman of the program committee. The summer cruise of the association will begin at Chicago, where the boat will leave from the Municipal Pier on Sunday morning, June 26, at 8:30 a.m. central standard time, or 9:30 Chicago time. It will leave Toledo Tuesday morning, June 28, at 11 o'clock central standard time or 12 o'clock eastern standard time, from the Toledo Railway & Light Company dock, which is adjacent to the White Star Line docks. The time of leaving Toledo was set back one hour by the committee on arrangements in order to permit various members to leave their homes Tuesday morning and arrive in Toledo in time to catch the boat. The details of the program follow:

Sunday, June 26, 11 a.m.

Song Service.
Address, by H. C. DeCamp.

Wednesday, June 29, 9 a.m.

Meeting of the Executive Committee.

"Automatic Substations," by C. A. Butcher, Westinghouse Electric & Manufacturing Company.

Discussion by Lawrence D. Bale, engineer of substations, the Cleveland Railway; Charles H. Jones, Chicago, North Shore & Milwaukee Railroad.

Thursday, June 30, 3 p.m.

"Merchandising Transportation," led off by the report of the committee on education and training of employees, by James P. Barnes, chairman, president Louisville Railway.

Discussion by Harry L. Brown, Western Editor ELECTRIC RAILWAY JOURNAL, Chicago; Bert Weedon, general freight and passenger agent, Interstate Public Service Company, Indianapolis; George H. Kelsay, superintendent of power and shops, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio; W. S. Rodger, general traffic manager, Detroit United Railway; E. B. Gunn, master mechanic, Western Ohio Railway, Wapakoneta, Ohio.

SPECIAL CARS TO BE RUN

The proposal to run a special car from Indianapolis to Chicago on Saturday, June 25 is being considered.

Those arriving in Chicago on Saturday night may go direct to the boat and secure their staterooms and breakfast Sunday morning on the boat for $2.50. The boat will be at the pier after 6 p.m., Saturday.

For those who desire to make only the trip from Toledo to Chicago, a special car has been arranged, leaving Indianapolis on Monday, June 27, at 7:00 a.m., Peru, Ind., at 9:30 a.m., and arriving at Fort Wayne, Ind., at 11:10 a.m. A thirty-minute stop here will be made for lunch and the car will leave Fort Wayne at 11:40, Lima, Ohio, at 1:40 p.m., Findlay, Ohio, at 2:50 p.m., and arrive at Toledo at 5:05 p.m., central standard time in each case.

On the return trip a special car will be run from St. Joseph, Mich., to Indianapolis, leaving St. Joseph July 12.

Those planning to attend this meeting and cruise, are urged to send in their reservations to John Benham, 15 South Throop Street, Chicago, at once, in order that their names may appear in the printed souvenir distributed on the boat.

Railroad Mechanical Section Postpones Meeting

The annual meeting of the American Railway Association, mechanical division, which was to have taken place at the Drake Hotel, Chicago, on June 15 and 16, has been postponed to June 29 and 30, 1921. The meeting place has also been changed from the Drake Hotel to the Blackstone. The official circular of June 10 announcing the postponement says:

> Owing to present unusual conditions and inability of members to attend the meeting of the mechanical division, American Railway Association, called to be held in this city (Chicago), Wednesday and Thursday, June 15 and 16, 1921, the meeting has been postponed to Wednesday and Thursday, June 29 and 30, 1921.
>
> The sessions will be held at the Blackstone Hotel, Chicago, instead of the Drake Hotel as originally planned. It is suggested that members arrange for their hotel reservations without delay.

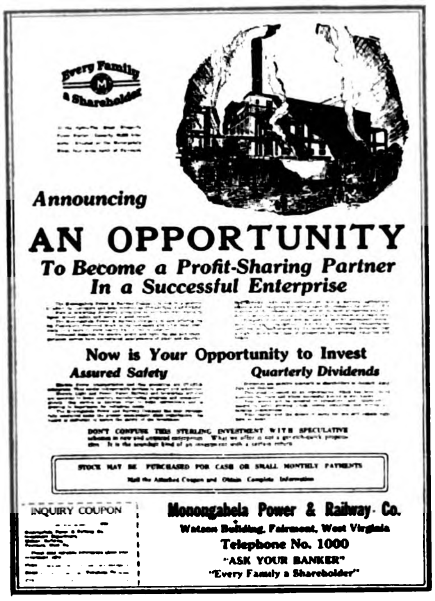
Financial and Corporate

Preferred Stock Offering to Be Continued

In the belief that it will be of advantage both to itself and to the communities served to have as many local stockholders as possible, the Monongahela Power & Railway, Fairmont, W. Va., will continue to offer its preferred stock even after the recent $2,000,000 offering of preferred stock has been taken. This offering was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 28.

A new department known as the "Investment Department" has been created to handle the sale of stock, bonds and other forms of securities offered. E. B. Smith is the manager of this department. He has eight salesmen in his organization at present. In addition to these regular salesmen, Mr. Smith is organizing the company's employees and has selected about fifty as an additional employees organization. Arrangements have been made with the banks in the territory served by the company whereby they will also assist in selling the stock. Thus the organization worked out for the handling of the stock includes eight regularly employed salesmen, about fifty employees and the banks, fifty-four in number.

Besides the offering being made direct to patrons through salesmen, advertising is being carried in ten newspapers, where every family is urged to become a "profit-sharing partner." In order to educate the public regarding the character of the company, extent of its property, kind of services rendered and its relation to the growth of the communities served by it descriptive matter and circulars have been mailed to patrons and customers and display cards announcing the sale have been posted in the company's ticket offices and waiting rooms. In connection with this offering the company has issued an interesting illustrated booklet, containing a map of the company's electric railway properties, proposed lines, power stations, gas lines, coal mines, etc.



Every Family a Shareholder

Announcing

AN OPPORTUNITY

To Become a Profit-Sharing Partner In a Successful Enterprise

Now is Your Opportunity to Invest

Assured Safety

Quarterly Dividends

DON'T CONFUSE THIS STERLING INVESTMENT WITH SPECULATIVE

STOCK MAY BE PURCHASED FOR CASH OR SMALL MONTHLY PAYMENTS

Mail the Attached Coupon and Obtain Complete Information

INQUIRY COUPON

Monongahela Power & Railway Co.

Watson Building, Fairmont, West Virginia

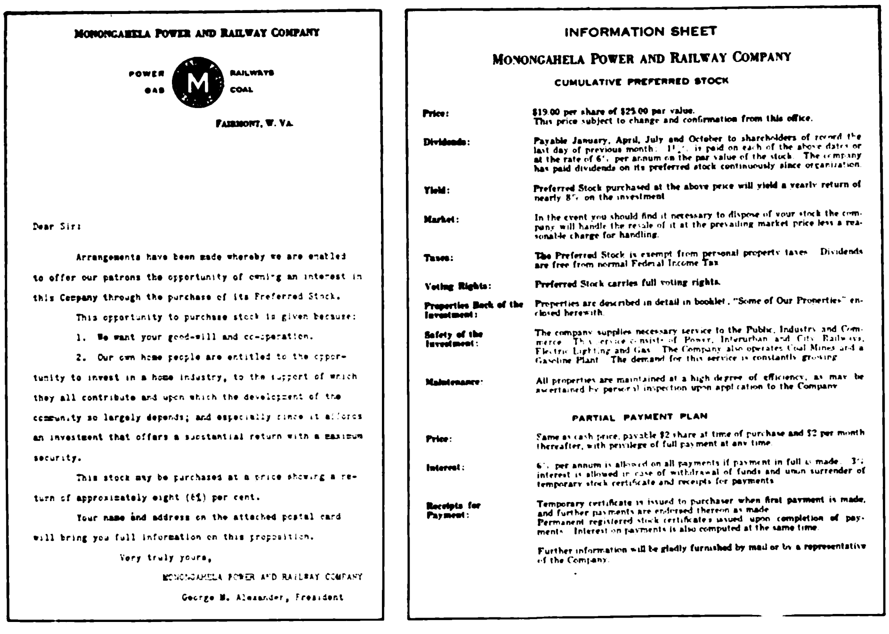
Telephone No. 1000

"ASK YOUR BANKER"

"Every Family a Shareholder"

TYPICAL NEWSPAPER ADVERTISEMENT

Although the outcome of this offering cannot at this time be clearly indicated, the sales made to date have been much in excess of expectations and indicate the success of the offering.



MONONGAHELA POWER AND RAILWAY COMPANY

POWER
GAS
M
RAILWAYS
COAL

FAIRMONT, W. VA.

Dear Sir:

Arrangements have been made whereby we are enabled to offer our patrons the opportunity of owning an interest in this Company through the purchase of its Preferred Stock.

This opportunity to purchase stock is given because:

1. We want your good-will and co-operation.

2. Our own home people are entitled to the opportunity to invest in a home industry, to the support of which they all contribute and upon which the development of the community so largely depends; and especially since it affords an investment that offers a substantial return with a maximum security.

This stock may be purchased at a price showing a return of approximately eight (8%) per cent.

Your name and address on the attached postal card will bring you full information on this proposition.

Very truly yours,

MONONGAHELA POWER AND RAILWAY COMPANY

George M. Alexander, President

INFORMATION SHEET

MONONGAHELA POWER AND RAILWAY COMPANY

CUMULATIVE PREFERRED STOCK

Price:	$19.00 per share of $25.00 par value. This price subject to change and confirmation from this office.
Dividends:	Payable January, April, July and October to shareholders of record the last day of previous month. 1½% is paid on each of the above dates or at the rate of 6% per annum on the par value of the stock. The company has paid dividends on its preferred stock continuously since organization.
Yield:	Preferred Stock purchased at the above price will yield a yearly return of nearly 8% on the investment.
Market:	In the event you should find it necessary to dispose of your stock the company will handle the resale of it at the prevailing market price less a reasonable charge for handling.
Taxes:	The Preferred Stock is exempt from personal property taxes. Dividends are free from normal Federal Income Tax.
Voting Rights:	Preferred Stock carries full voting rights.
Properties Back of the Investment:	Properties are described in detail in booklet, "Some of Our Properties" enclosed herewith.
Safety of the Investment:	The company supplies necessary service to the Public, Industry and Commerce. This service consists of Power, Interurban and City Railways, Electric Lighting and Gas. The Company also operates Coal Mines and a Gasoline Plant. The demand for this service is constantly growing.
Maintenance:	All properties are maintained at a high degree of efficiency, as may be ascertained by personal inspection upon application to the Company.

PARTIAL PAYMENT PLAN

Price:	Same as cash price, payable $2 share at time of purchase and $2 per month thereafter, with privilege of full payment at any time.
Interest:	6% per annum is allowed on all payments if payment in full is made. 3% interest is allowed in case of withdrawal of funds and upon surrender of temporary stock certificate and receipts for payments.
Receipts for Payment:	Temporary certificate is issued to purchaser when first payment is made, and further payments are endorsed thereon as made. Permanent registered stock certificates issued upon completion of payments. Interest on payments is also computed at the same time.

Further information will be gladly furnished by mail or by a representative of the Company.

APPEAL MADE DIRECT TO PROSPECTIVE PURCHASER

Toledo $260,672 Behind

Cumulative Deficit Increased by $56,371 in May—Prospects Greatly Improved

The increasing economy of operation of the Toledo railway lines, under Commissioner Wilfred E. Cann, is shown in the report for May, when the smallest monthly deficit yet sustained was reported. The net loss in operation for the month was $56,371. The total deficit accrued in four months is $260,672.

Chairman Henry Truesdall of the board predicted a fare increase to 7 cents in August. The service-at-cost ordinance provides for no fare change in the first six months of operation. Commissioner Cann believes, however, that fares will be back to 5 cents within a year.

During the month of June further anticipated savings should amount to $25,000, due to decrease in wages of carmen. The men last week ratified the agreement by which their scales were set at 45, 47 and 50 cents an hour. This is a cut of 10 cents an hour from the last year scale. This new scale was incorrectly reported in the ELECTRIC RAILWAY JOURNAL for June 11 to be 45, 57 and 60 cents.

The power rate has not yet been adjusted. Some believe it can be reduced nearly 50 per cent. Even a 10 per cent reduction would mean a saving of $24,000 on four months' operation.

Further rerouting plans have been approved. Service will be cut off the Maumee Avenue end of the Starr-Maumee line. Cherry cars will not run from the Union Station loop. A saving of more than $4,000 a month with little change in service will thus be gained.

No decision has as yet been made by the Common Pleas Court on the bus regulatory measure. The case is held up by a temporary injunction which bus owners secured.

In May, although railway passenger receipts fell off $2,631 as compared with the previous month, due to increased interurban rentals and car rentals, the net income increased $8,677. Operating expenses were cut $15,286 as compared with April. The monthly operating ratio also decreased from 90.60 to 83.46.

Commissioner Cann said the loss of 1.0544 cents per passenger during May should call for a further reduction in service but that the present schedules would be maintained. Average daily passenger receipts for the last four months are as follows: February, $9,500; March, $9,186; April, $8,988; May, $8,613. June shows a further decline over May figures of $325 a day.

Construction Company Denied Payment.—The application of the Interborough Subway Construction Company, an Interborough subsidiary, for a writ of mandamus directing Controller Craig to pay the company $1,750,000 as part of the cost of installing the multiple car door device, was denied recently by Justice Gavegan of the Supreme Court.

Answers to Accounting Questions

Another Series of Questions and Tentative Answers Under the Uniform System of Accounts for Electric Railways

Another series of tentative answers to questions raised in connection with the uniform system of accounts, prescribed by the Interstate Commerce Commission, has just been issued. As these answers have not received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

THE case numbers covered below are from A-589 to A-602, with certain omissions. Other installments will follow. The omitted numbers represent cases which either are not of sufficient importance to justify publication or involve questions upon which a definite conclusion has not been reached.

Q (*A*-589). To what account should be charged:

(a) Taxes payable on monies and other items the income from which is includible in account 208, "Income from unfunded securities and accounts?"

(b) Federal income and excess profits taxes?

(c) Internal revenue stamps for use generally in railway operations?

(d) A carrier's investment in war savings stamps and war thrift stamps?

(e) War taxes paid on telephone and telegraph messages?

A. (a) To account 215, "Taxes assignable to railway operations," or to account 218, "Miscellaneous taxes," in accordance with the texts of those accounts.

(b) To account 215, "Taxes assignable to railway operations," unless directly assessed on income from miscellaneous physical property, in which case account 205, "Net income from miscellaneous physical property," shall be charged or unless they are assessed on income from securities owned and are therefore chargeable to account 218, "Miscellaneous taxes."

(c) To account 215, "Taxes assignable to railway operations."

(d) To account 409, "Loans and notes receivable."

(e) To account 215, "Taxes assignable to railway operations," or to road and equipment account 549, "Taxes," as may be appropriate.

(See Cases 584 and 598 (a).)

Q. (*A*-590). An industry furnishes cars for movement of its employees from city points to its suburban plant. The carrier furnishes locomotive, crew and electricity, and hauls the cars over its own rails to the industrial plant, for which it is paid on the basis of locomotive trips. How should the revenue be credited?

A. To account 109, "Miscellaneous transportation revenue."

Q. (*A*-591). A carrier under contract to transport mail, during a temporary stoppage of its own transportation facilities, hires an automobile and driver to perform that service. To what account should the expense be charged?

A. To account 78, "Other transportation expenses."

Q. (*A*-592). What is the proper accounting for investment in and maintenance of turntables located at the entrances of shops?

A. The investment is chargeable to account 523, "Shops and carhouses," and the maintenance to account 24, "Buildings, fixtures, and grounds."

Q. (*A*-593). To what account should be charged:

(a) The cost of special work or curves made in the carrier's own shops?

(b) The cost of cut rails issued from stock to connect such items as switch mates, switches, frogs, etc., in the lead of a special work layout?

A. (a) To account 508, "Special work." Plain curves shall be treated as rails.

(b) If the cut rails are only sections of rail which are necessary to connect up the switch mates, switches, frogs, etc., with the last regular rail laid in the track their cost shall be charged to account 507, "Rails, rail fastenings and joints," but if they are of special character, not simply a section of ordinary rail, they shall be included in account 508, "Special work."

Q. (*A*-595, a). When electric light sockets and switches are installed as permanent parts of buildings, cars or conduits, should renewals be considered supplies as indicated in Case 216 in Accounting Bulletin 14?

A. In such cases they shall be charged for appropriate repair accounts.

(See Case 69, Accounting Bulletin 14.)

Q. (*A*-595, b). To what account should be charged the pay of employees under the supervision of the general treasurer who are stationed at car barns to receive conductors' collections?

A. To account 63, "Superintendence of transportation."

Q. (*A*-596, a). To what account should be charged repairs of oil pumps, oil tanks and permanent tank piping installed in an oil house at shops?

A. If this apparatus is for distributing oil for shop use, the repair expense for the tank and piping shall be charged to account 24, "Buildings, fixtures, and grounds," and that for the pump, if not a part of the tank, to account 36, "Shop equipment." If the apparatus is for oil used in connection with conducting transportation, all repairs shall be charged to account 24.

Q. (*A*-596, b). To what account should be charged repairs to a sand hopper and to the piping connecting the sand drier with the hopper?

A. To account 24, "Buildings, fixtures, and grounds."

Q. (*A*-597). To assist in retaining its employees a carrier built and operates a temporary rooming building. How should the revenue and expenses of this project be distributed?

A. Rents received from employees shall be credited to account 117, "Rent of buildings and other property." Building repairs shall be charged to account 24, "Buildings, fixtures, and grounds," and expenses of operating for employees' use to account 78, "Other transportation expenses."

Q (*A*-598, a). To what account should be charged:

(a) The cost of revenue stamps affixed to proxies sent in by stockholders for use at the annual meeting? (b) The cost of stamps affixed to notes classified as unfunded debt?

A. (a) To account 225, "Miscellaneous debits," (b) To account 221, "Interest on unfunded debt."

(See Cases 584 and 589.)

Q. (*A*-598, b). A carrier assumes the rent for an encampment site in order to induce school cadets to hold an encampment on its line. To what account should the rent be charged?

A. To account 81, "Parks, resorts and attractions."

Q. (*A*-599, a). At the direction of the court, pending a decision as to the legality of a fare increase, a carrier deposits daily with a trust company amounts equivalent to the difference between revenue based upon the former fare and the total of fares collected. What is the proper accounting?

A. The deposits with the trust company shall be debited to account 408, "Special deposits," and concurrently credited to account 446, "Other unadjusted credits." If final decision favors the carrier the amount shall be transferred from account 446, to account 101, "Passenger revenue," unless the decision is delayed beyond the current year and the amount is relatively large, in which event the carrier may apply for permission to use account 304, "Delayed income credits." If the increased fare is decided to be illegal accounts 408 and 446 shall be cleared as the refunds are made.

Q. (*A*-599, b). What is the proper accounting for equipment permanently retired from service but held for disposition?

A. It shall be written out of the property account and carried in a suspense account at an equitable valuation.

Q. (*A*-601). To what account should be charged the cost of metal fare tokens sold to patrons for use in lieu of tickets and coins?

A. To account 67, "Miscellaneous car service expenses." Tokens held in stores shall be carried in account 411, "Material and supplies," until issued for use.

Q. (*A*-602, a). To what account shall be charged the cost and maintenance of a pier to be used exclusively for handling powerhouse fuel?

A. The investment cost shall be charged to account 539, "Power plant buildings," and the maintenance cost to the appropriate primary accounts under general account III, "Power."

Cash-Fund Ordinance Pending

In consideration of the June appropriation ordinance for the Seattle (Wash.) Municipal Railway it was decided at a recent meeting of the utilities committee of the Council to set aside each month out of the earnings one-twelfth of the yearly charges for bond interest and redemption. The department's auditor suggested waiting until the interest and redemption dates before setting aside the cash needed to save going on a warrant basis earlier.

Superintendent D. W. Henderson, however, said the fund had $132,574 in cash on hand in the city treasury after allowance for outstanding warrants, and recommended setting aside the interest and redemption cash since there was a surplus on hand. The first item considered was setting aside interest and redemption on an issue of $775,000 general bonds, maturing from 1933 to 1938. As the state law does not require setting aside money for redemption of general bonds until seven years before maturity, it was voted not to set aside money for this purpose now. It was decided to set aside funds for interest on the general bonds, also for interest and redemption on the utility bonds.

As the matter stands at present, the railway did not set aside in March, April or May the $70,250 chargeable monthly for the redemption of the $833,000 issue of the $15,000,000 Stone & Webster bonds due next March 1, and on another small issue, and so owes that fund $210,750. The $70,250 for June for this purpose will be set aside. No money has been set aside for depreciation, the money being used to retire outstanding warrants.

Coal, Material and Labor Costs Decrease Earnings

According to the annual report of the Terre Haute, Indianapolis & Eastern Traction Company for the year ended Dec. 31, 1920, the company had, after paying operating expenses, taxes and fixed charges, $725,000 to meet dividend requirements, interest on notes, car trust equipment notes, sinking funds, etc. Gross earnings amounted to $5,316,288, an increase of 18.64 per cent over the previous year, while operating expenses, which were $3,805,565, were 23.38 per cent more than in 1919. This increase absorbed practically all of the gain in earnings due to advances in the price of coal, material and labor.

The tax rates were raised in 1920, so that the average rate on the entire system was $1.85 as compared with $1.26 in 1919. The result of this was that the amount paid out in taxes for the year increased 18.96 per cent.

The total amount spent for maintenance was $1,314,192, compared with $1,059,898 in 1919. The greater proportion was for maintenance of way and structures, which amounted to $694,274, an increase of $210,920 over the previous year. The total railway maintenance was $1,135,761 as against $946,122 in 1919.

Some idea of the amount of traffic handled can be had from the following statistics: During the year 9,719,308 passengers were carried on the interurban lines and 19,671,918 on the city lines, making a total of 29,391,226 passengers of all kinds. The freight tonnage handled was 134,342 in addition to 116,292 tons of express matter. The car-miles operated on the interurban lines amounted to 5,837,378 and on the city lines 3,424,961. The coal consumed at the power station was 261,239 tons, while the kilowatt-hours generated at the main power station were 118,527,211. The company operates 435.64 miles of main line, of which 33.21 miles are so-called city lines.

$19,628 Earned on $3,576,740 Investment

The annual report of the Bamberger Electric Railroad recently filed with the Public Utilities Commission of Utah shows a net profit of $19,628 from operation on an investment of $3,576,740 in its 35.94 miles of road, running between Salt Lake City and Ogden, Utah.

The report shows that the company had on hand at the beginning of the year accredited to profit and loss the sum of $602,327, and at the end of 1920 the sum of $621,955. The increase in the grand total of its assets over the year 1919 amounted to $261,416, or from $3,858,314 at the close of 1919 to $4,119,729 at the close of 1920. Of this latter figure the company claims to have assets of $3,576,740 in road and equipment, an increase of $182,255 over the preceding year and $46,802 in miscellaneous property, or an increase of $17,500 over 1919.

The investments in affiliated companies shows neither increase nor decrease. This amounts to $147,652. In bonds investment the increase amounts to $600, bringing the total investment in bonds to $36,800. The total investment exceeded the 1919 figure by $200,355.

Current assets shows an increase of $61,685 in spite of several large decreases in certain lines, such as a $40,000 decrease in special deposits. Miscellaneous accounts receivable show an increase of $55,068, and the materials and supplies purchased during 1919 add considerable to this figure in compiling the current assets figure.

The sum of $52,083 was invested in road equipment during the year. In addition $1,766 was expended in substation equipment and $2,874 in miscellaneous expenditures, bringing the total expenditures for betterment up to $182,255.

The company has 73.21 miles of tracks at an average investment of $48,856 per mile.

The company holds $75,000 in first mortgage bonds of the Salt Lake & Ogden Railway drawing interest at 5 per cent, which is the only money or security in the sinking fund.

Financial News Notes

Portland Dividend Declared.—The Portland Railway, Light & Power Company, Portland, Ore., recently declared an initial dividend on the Series "A" first preferred 7½ per cent stock. This payment covers dividends for the period of Jan. 1, 1916, to April 1, 1917.

$3,000,000 Offered in Bonds.—Whitaker & Company, St. Louis, Mo., are offering three-year 8 per cent sinking fund mortgage bonds of the Columbus Railway, Power & Light, Columbus, Ohio. The bonds are dated June 1, 1921, and are due June 1, 1924. The price is 98 and interest to net 8¾ per cent.

Operation of Line Expected.—At a recent conference between Receiver Whysall, his attorney, and W. P. Sturtevant, New York, representative of the bondholders, it was brought out that service may be resumed by the Springfield Terminal Railway & Power Company, Springfield, Ohio. Receiver Whysall, who will plan the reorganization, has given out no statement on this project. The property was sold under foreclosure in June, 1920, for $300,000.

Raleigh Property for Sale.—James H. Pou, Raleigh, and N. A. Sinclair, Fayetteville, N. C., have been appointed commissioners to sell the property of the Cumberland Railway & Power Company, Raleigh, N. C., at receiver's sale on July 2. The company was organized in 1919 and acquired the street railway property in Fayetteville which had long been in disuse. Some months ago a receiver was appointed for the property on the petition of a Lillington bank when interest was defaulted.

Railway Offered to People.—At a recent meeting of the Valdosta (Ga.) Chamber of Commerce the possibility of dismantling the Valdosta Street Railway was discussed. The property just about pays expenses and it was stated that unless the people took over the railway it probably would be junked. Judge Crawford stated that if 100 or more people would take over the railway and work in its interest operating expenses and a small dividend could be paid. The offering price is $15,500.

Eureka Property for $75,000.—The people of Eureka, Cal., will be offered the property of the Humboldt Transit for $75,000, and provision will be made for an additional $30,000 as working capital for the operation of the lines by the city. This proposition will be voted on June 20. The State Railroad Commission recently valued the property at $100,000 but the attorney for the Humboldt National Bank, which represents the bondholders of the railway, announced that the bank had been authorized to submit $75,000 as the valuation of the lines.

Traffic and Transportation

Autos Under Commission

California Railroad Commission Announces Establishment of Automobile Department

So rapid has been the growth of the automobile transportation industry that the Railroad Commission of California has announced the establishment of an automobile department under the supervision of Charles A. Beck. This department will be responsible for all detail work connected with the automobile stage and truck matters, will care for all informal complaints and correspondence, keep time-table and schedule filings, handle applications which can be disposed of by ex parte orders, handle and assign applications requiring public hearing, answer all verbal inquiries, and in general be responsible to the commission for all work in connection with the operation of stages and trucks under its jurisdiction.

Rates, fares and regulations will be handled by the rate department. Issuance of stock, bonds, notes or other securities and the filing of annual or other financial statements will be handled by the department of finance and accounts. The service department as heretofore will look after safety of operation, equipment of cars and the like.

The commission announces that Mr. Handford will be responsible for the formulation of definite lines of policy affecting auto, stage and truck transportation so as to promote uniformity of decisions. Opinions and orders, excepting the minor ex parte orders, will be reviewed and concurred in by Mr. Handford before presentation to the commission for its consideration.

In all matters of accident, investigation and other questions incidental to transportation from the service standpoint, the service department will continue to function through Mr. Handford reporting to the commission as heretofore.

The numerous complaints that come up from competing auto stage lines in regard to irregular operations of some of the auto bus lines have been noticeable at various hearings before the commission during the past year. Recently the Pasadena-Pomona auto stage line filed a complaint with the commission citing the fact that the Motor Transit Company, the largest auto stage operating lines out of Los Angeles, in operating its auto stages between Los Angeles and San Bernardino was violating the terms of its operating franchise rights granted by the Railroad Commission by doing local business on its through schedule. This class of complaint with auto stage lines is frequent with the commission, as many of the stage lines were losing money during the year 1920 and found it difficult to strictly abide by its franchise.

Recently the Burbank Stage Line in applying for an increase in rates informed the commission its losses for the year were $20,000. The Motor Transit Company claimed a loss of $120,000. At a recent hearing of a freight auto transportation line running out of San Diego, where an application had been made to the commission to increase its rates 25 per cent, the commission denied the increase as the manager of the auto freight carrying line could not produce any figures as to his losses, stating that he did not keep any books.

City of Toronto Plans Important Rehabilitation

The Board of Control, Toronto, Ont., has recommended that the City Council pass a by-law providing $7,000,000 for the use of the Toronto Railway Commission in connection with the purchase of the new cars and other equipment by the commission for use next fall when the city takes over the Toronto Railway. H. H. Couzens, Toronto, is general manager of the Toronto Transportation Commission, Ryrie Building, Toronto.

The commission is also planning to construct a new railway through Rosedale and the north limits of the city passing east of Mount Pleasant Cemetery. This line will be constructed if the city opens up certain streets requested by the commission.

The arbitration board has been finally completed which will determine the price to be paid and other details in connection with the acquisition by the city of Toronto (Canada) of the Toronto Railway system upon the expiration of the railway franchise, which takes place next September.

The railway chose Sir Thomas White, former Minister of Finance in the Dominion Government, while the municipality appointed Sir Adam Beck, chairman of the Hydro-Electric Power Commission. These two arbitrators have now agreed upon Hume Cronyn, M. P., as the third member and chairman of the board. Mr. Cronyn is a native of London, Ont. He is prominently identified with a number of financial institutions in his home town.

Transfers Reduced in Size.—The Milwaukee Electric Railway & Light Company placed in use on June 1 on its Milwaukee city lines a reduced-size transfer. The new transfer is 2 in. x 4 in., or 1½ in. shorter than the transfer previously used. The change in size of the transfer was made for the purpose of conserving paper stock.

New Board Attacked

Counsel for Public Service Railway Contends Before Court Evidence Proved Ten-Cent Fare Need

Argument was heard in Part II of the Supreme Court at Trenton, N. J., on June 10 upon the appeal of the Public Service Railway from the decision of the Board of Public Utility Commissioners refusing to grant the corporation permission to charge a 10-cent fare. Frank Bergen and Robert H. McCarter, former attorney-general of the state, appeared for the company. The commission was represented by L. Edward Herrmann, its counsel. The cities, which are opposing the increase, were represented by George L. Record. The court reserved decision.

Mr. Bergen said that the proceedings of the board in recent years had taken a direction and reached a point which not only threatened but seriously affected the fundamental rights of parties interested in utility corporations. He said further that whether or not an existing rate was reasonable was a judicial question. At one phase of the proceedings Justice Trenchard interrupted Mr. Bergen to inquire: "This is really an attack on the utility act by you, isn't it, not on the order of the board in question?"

Mr. Bergen answered that it was an attack on the method employed by the board in the face of overwhelming testimony.

TEN-CENT FARE ESSENTIAL

Mr. Bergen said further that under the present 7-cent fare the company will lose more than $2,000,000 during the calendar year. The commission had failed for several years past, he said, to provide a fare sufficient to meet operating expenses, fixed charges, taxes and depreciation, let alone a return on the company's capital stock of $48,731,600. It was Mr. Bergen's contention that the 10-cent fare would enable the company to pay its taxes, operating expenses and fixed charges, set aside $1,850,000 for depreciation and earn a net income of $1,266,000, or 2½ per cent on its capital stock, provided the rate were granted for a full year.

Mr. Bergen said:

> Disaster to the company is inevitable unless it is afforded the instant relief to which the Court of Errors and Appeals has held it is entitled. It is intolerable that a plain remedy should be withheld by the board for reasons unsupported by either facts or law. The utility act expressly provides for the fixing of a reasonable rate under the conditions that here exist, and the Court of Errors has clearly defined what elements are to be considered. At the hearings the board solemnly declared its purpose to obey the law as laid down by the court (Case, page 364), but when the time for action arrived it reversed its intention. It is indeed fortunate that we have this court of law to which we may confidently appeal.

In opening his case for the municipalities Mr. Record declared that the commission could have withheld its decision until after July 15, when it was bound by law to announce what it considers a just and reasonable fare. By rendering its decision it gave the company opportunity to appeal in this case, thereby delaying valuation proceedings.

Birmingham Situation Critical

Several Months of Operation Prove Seven-Cent Fare Inadequate—Jitneys a Menace

Hearing of an application of Lee C. Bradley, receiver for the Birmingham Railway, Light & Power Company, Birmingham, Ala., for authority to raise fares in Birmingham has been set for June 28 before the Alabama Public Service Commission at Montgomery. Right to increase fares from 7 to 8 cents in Birmingham and its suburbs and to levy a charge of 2 cents for transfers is asked in the petition, which was filed by Mr. Bradley on June 8 before the Public Service Commission. Judge William I. Grubb, of the United States District Court, issued a formal order on June 4 authorizing the receiver to apply for the increased fare.

VIGOROUS opposition to any increase in the present 7-cent fare has been voiced by members of the City Commission of Birmingham, who state that the city will fight the proposed advance to the bitter end. It has been indicated by city officials that the public utilities act, under which the Alabama Public Service Commission is granted the exclusive right to regulate rates to be charged by public utility companies operating in the state, may be attacked in the efforts to defeat an increase in fares.

Heavy decreases in the earnings from the operation of the railway are set up by the receiver as the grounds upon which the increase is asked. In his application he shows that receipts have decreased in spite of the recent raise in rates from 6 to 7 cents.

Operation of jitneys in competition with the railway is given by the receiver as one of the contributing causes for the decrease in revenue from the railway department. However, the general business depression and the unemployment situation are cited as the principal cause for the decrease in earnings.

A jitney regulation ordinance was recently adopted by the City Commission, but has not yet been put into effect. Under the terms of this the receiver maintains that the jitneys are recognized by the city as a competing service. The ordinance as originally drafted provided that all jitneys must furnish an adequate indemnity bond or must carry an adequate amount of liability insurance, but these provisions were killed by the majority of the commission before the final adoption of the ordinance. As adopted it provides certain police and traffic regulations and routes for the jitneys. In some instances they are removed from the railway lines, but in several others the jitney routings are allowed to follow the car lines.

In his application to Judge Grubb for authority to apply for the increases Receiver Bradley reviews at length the financial situation of the Birmingham Railway, Light & Power Company and of the causes which make the increased fare necessary. It is shown that when the application for a 7-cent fare was made the cash condition of the estate as of Nov. 1, 1920, showed a deficit of $1,435,101 with other obligations which increased the total obligations of the receiver to $1,873,822.

The increase in fare to 7 cents, it was estimated, according to the application, would produce approximately $25,000 a month in increased net revenue. The petition shows, however, that in January with the 7-cent fare there was an increase of $32,719 in comparison with January, 1920. In February there was a gain of $25,009 over the preceding February. March showed a gain of $15,779 over the same month of 1920. But April showed a loss of $10,871 in comparison with the preceding April. May showed a loss of $24,007. Pointing to the steady decrease the receiver says:

> Instead of receiving approximately $25,000 a month in increased revenue, we find that in the month of May we have a decrease of $24,007, or approximately $50,000 less than was deemed necessary at the time the 7-cent fare was granted.

This condition, Mr. Bradley states, results from business depression and that all lines are showing decreases in comparison with the figures for last year. Lines upon which jitneys are in operation, he states, are showing very heavy decreases. Owing to the uncertainty of jitney operation the receiver points out that it is difficult to estimate the loss caused but that from checks made they were apparently causing a loss of approximately $700 a day during the month of May. The loss from the business depression was estimated at $900 a day for May.

Although operating expenses, it is stated, have been cut from 32.3 cents per car-mile in December, 1920, to 30.5 cents per car-mile in May, 1921, yet the increased revenue from the 7-cent fare has been more than offset by jitney competition and business depression. Other departments are shown to be making a profit or breaking even.

Fare Restraint Suit Brought

A suit to restrain an increase in fare by the Cincinnati (Ohio) Traction Company on July 1 from 8½ cents to 9 cents was filed in the Hamilton County Common Pleas Court by Saul Zielonka, City Solicitor of Cincinnati, during the week ended June 11. Judge Stanley Struble granted a temporary injunction. The suit, similar to a previous one, was made necessary because under the present franchise of the railway, the company contends it must give notice on the fifteenth of the month where deficits have occurred in operation of its lines.

The company and city officials within the last few days have agreed to changes in the franchise, as a result of which, among other things such injunction suits will be unnecessary in the future. As in the former suits in which an increase in the rate of fares was enjoined by the city, the city solicitor again predicates upon the contention that if proper adjustments are made of credits given to subsidiary companies of the Ohio Traction Company the Cincinnati Traction Company would not have a deficit.

Jitney Regulation in Detroit

A new ordinance has recently been passed in Detroit, Mich., regulating jitneys. The new ruling will compel owners and drivers to furnish surety bonds and to indemnify passengers against loss or injury. Owners must supply a $1,000 bond and pay a $3 license fee for every car operated while drivers must put up a $200 bond. Licenses are revocable at the Mayor's will. The penalty for violation of the ordinance is a $500 fine or a prison term of 90 days. The rule became effective on June 15 and will result, it is believed, in a substantial reduction of such vehicles operated.

Litigation Dismissed in Cedar Falls

At a special meeting of the City Council of Cedar Falls, Ia., on May 31, called for the purpose of further consideration of the long drawn-out fare controversy, a resolution was adopted accepting the Waterloo, Cedar Falls & Northern Railway's proposition. Accordingly the 8-cent cash fare continues until the latter part of August and the city of Cedar Falls has dismissed the litigation and authorized the trustee to turn the balance of the money back to the railway.

The 10-cent fare was established in Cedar Falls in September, 1920, by injunction proceedings in the District Court of Black Hawk County, Iowa. Under an order of court the company was required to issue receipts to passengers requesting the same, covering the difference between a 5-cent cash fare and the 10-cent fare, the money represented by such receipts issued being deposited in the hands of a trustee, to be held as a fund in court for future order of the court. The 10-cent rate was collected under this plan until March 1, 1921. The latter part of February, at a meeting between Manager Cass and the City Council of Cedar Falls, Mr. Cass agreed for experimental purposes to install a 7-cent cash fare rate for the month of March, if they would turn over to the company the money that was in the hands of the trustee represented by the receipts outstanding, in amount of 3 cents per receipt. Further that if the 7-cent cash fare rate did not produce an average gross revenue equal to the average gross revenue at the 10-cent rate for the preceding five months that they would permit an 8-cent fare to be installed on April 1.

The agreement was made, the money was drawn down by stipulation in the District Court, and the 7-cent fare installed. It ran through the month of March and the result showed a 12 per cent increase in travel and about a 16 per cent decrease in gross revenue. On April 1, under the agreement, the company therefore installed the 8-cent cash fare. It ran through the month of April and resulted in a decrease in travel over the 10-cent rate and, of course, a decrease in the gross revenue accordingly.

A series of meetings was held during May with the City Council in an attempt to adjust the whole dispute, and finally the City Council was advised that as a last proposition the railway would continue the 8-cent cash fare rate until the latter part of August, 1921, if the city released the balance of the money that was in the trust fund and dismissed the litigation. Another condition of the proposal was that at the end of August the 10-cent cash rate would be reinstalled if the 8-cent rate did not produce a reasonable return on the investment or equal the average return at the 10-cent rate during the five months that the 10-cent fare was in effect.

As previously indicated, the Council on May 31 accepted the proposition but it did not do so until Manager Cass notified the members that if they did not accept it he would install the 10-cent cash fare rate on June 1 and test the matter out in court.

Purchases Equipment—Wins Business.—The Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, has a contract for hauling about 35,000 tons of stone. The stone quarry is situated adjacent to the company's track. The business was secured by the railway property's purchasing the necessary equipment.

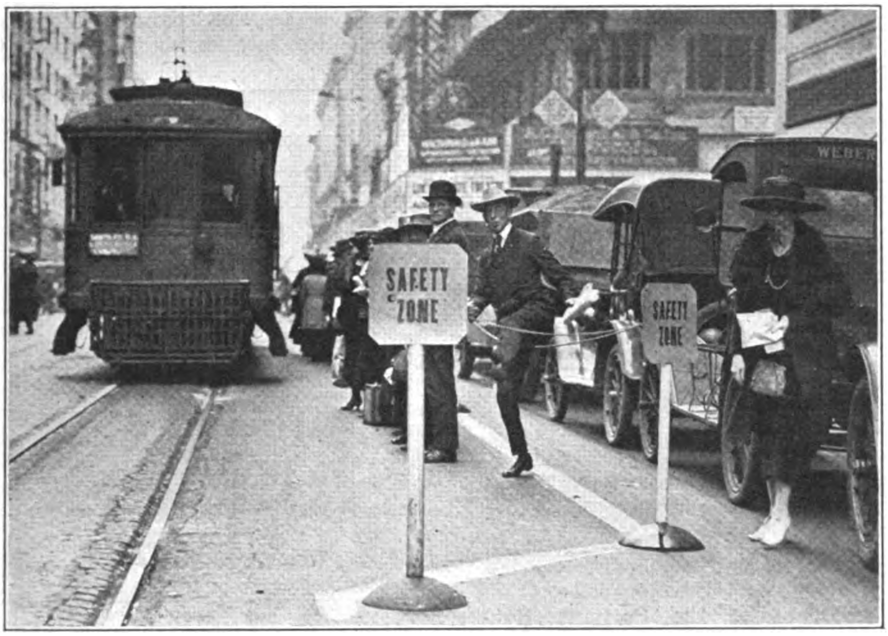
Safety Zone Plan Extended in Los Angeles

Following establishment of a new style safety zone at Seventh Street and Broadway, the busiest point in Los Angeles, Cal., extension of the zone has been ordered by the city.

When the first test was made safety zones were established at the four corners of the intersection 90 ft. long and 4 ft. wide. The zone was marked by white strips painted on the pavement and by chains suspended from stanchions. Entrance to the safety zone was from the front, in line with the property limits.

The zones have been increased in size so that they are now 100 ft. long and 5 ft. wide from the car clearance line. The white-painted strips are to be replaced with white cement strips inset in the pavement. Two chains instead of one, suspended from heavier stanchions, will mark the limits. The zone has room for two cars to load and unload at the front and rear doors and permits the front door of a third car to enter. When traffic is closed, autos must stop in line with the front of the zone.

The plan has proved satisfactory, is speeding up loading of cars and prevents accidents.



SAFETY ZONE AS ESTABLISHED IN LOS ANGELES

Fare Rise in Sault Ste. Marie

The Utilities Commission of Michigan recently issued an order increasing passenger fares on the Sault Ste. Marie Traction Company from 5 to 7 cents, with four tickets for 25 cents. The order went into effect on April 25 and will be in effect until the commission takes a complete inventory and appraisal of the property. The commission in its finding stated that it was convinced that the company was not earning enough money to meet operating expenses.

Transportation News Notes

Increased Fares in Force.—The Ohio Electric Railway, Springfield, Ohio, has placed in effect the new passenger rates authorized by the State Utilities Commission. They are as follows: Columbus to Newark from 90 cents to $1, one way; to Zanesville from $1.65 to $1.80; to Dayton from $1.75 to $2.

Another Five-Cent Line.—New rates of fare and method of operation will be put into effect in East Boston and Chelsea commencing on June 18, providing a 5-cent local fare, without free transfers, in those sections, and a dime fare to and from Boston proper. General Manager Dana of the Boston Elevated Railway has announced this change.

Must File Lower Rate.—The Pottsville Union Traction Company, Pottsville, Pa., has been ordered to file a tariff at the commission office allowing four tickets for 30 cents. The present charge is 10 cents with no ticket fare in effect. Commissioner Rilling decided that the rate was "excessive and unreasonable." The company was also ordered to extend transfer privileges on its Minersville and Yorkville divisions. The Pottsville Union Traction Company is owned and operated by the Eastern Pennsylvania Railways.

Three-Cent Fare on Municipal Line.—According to a statement given out by Councilman Oliver T. Erickson a sufficient number of signatures already returned virtually assure a vote next spring on his initiative ordinance for a 3-cent fare on municipal car lines of Seattle. Petitions have been circulated for some weeks by the Public Ownership League to get voters to sign their approval of the initiative ordinance to be put on the ballot at the municipal election. Councilman Erickson states that while enough signatures have been secured, the petitions will continue to circulate as a matter of education for the people in acquainting them with the plan.

Jersey Railway Carries 9,000,000 Passengers.—The report of Robert G. Fleming, assistant city treasurer of Camden, N. J., and Martin Schreiber, general manager of the southern division of the Public Service Railway, shows that the jitneys in Camden carried 1,429,166 passengers from Jan. 1 to May 1. The Public Service Railway has carried approximately 9,500,000 up to June 1. The jitney owners' receipts for the four months totaled $100,041. Public Service receipts, it is said, equaled $665,000 by June 1. There are 132 jitneys in Camden. The Public Service Railway carries about 50,000,000 passengers each year on the southern division.

Personal Mention

M. R. Bump Heads N. E. L. A.

F. T. Griffith, Portland Railway, Light & Power Company, Elected a Vice-President

Milan R. Bump, chief engineer for Henry L. Doherty & Company, New York, was elected president of the National Electric Light Association at the closing session of the annual convention of that organization in Chicago on June 3. Mr. Bump succeeds Martin J. Insull, vice-president of the Middle West Utilities Company, Chicago.

Other officers elected were: First vice-president, Frank W. Smith, United Electric Light & Power Company, New York; second vice-president, Walter H. Johnson, Philadelphia Electric Company; third vice-president, Franklin T. Griffith, Portland Railway, Light & Power Company, Portland, Ore.; fourth vice-president, J. E. Davidson, Nebraska Power Company, Omaha; treasurer, H. C. Abell, American Light & Traction Company, New York.

M. R. BUMP

The new president is an engineer of broad experience with a sympathetic understanding and appreciation of all phases of the utility business. Milan R. Bump is the fourth member of Henry L. Doherty & Company to become president of the N. E. L. A. Since 1910, except for a few months six years ago when he was vice-president of the Picher Lead Company, Mr. Bump has been chief engineer of the Doherty organization in charge of all engineering and of the construction and operating departments of the public utility division. Later he became a member of the executive committee of the company in charge of the oil transportation, refining and marketing divisions and the natural-gas division.

Mr. Bump was born at Rock Falls, Wis., March 18, 1881. At the age of twenty-one he was graduated in electrical engineering from the University of Wisconsin. In 1904 he became associated with Henry L. Doherty as the first cadet engineer of the Doherty training schools. He served as engineer on several Doherty properties until 1910, when he came to New York to take up his present duties. During his first five years as chief engineer of the Doherty organization Mr. Bump was engaged largely in examining for purchase and revamping many of the utility properties of the Cities Service Company subsidiaries.

In his work of rehabilitating sick utilities Mr. Bump has become a firm believer in the value of good public relations. It is not surprising therefore to find in him one of the most ardent advocates of customer ownership of public utility securities. He is a thorough student of public utility problems even though they be apart from engineering, and through his executive touch with properties in more than half the states he brings to the N. E. L. A. a well-balanced national point of view that should prove of immeasurable value to the electric light and power industry.

Franklin T. Griffith, third vice-president of the association, is a public utility executive who, for a number of years, has fought for water-power legislation that will permit the economical development of Western power resources.

As an attorney he has made great strides in codifying laws governing the development of water powers, and as president of the Portland Railway, Light & Power Company, Portland, Ore., he has been applying his sympathetic understanding of human nature to smooth the way for the utility in best serving the public. When the national water-power laws were being formulated the experience and advice of Mr. Griffith were widely sought, and he gave largely of his energy in constructive thought on this legislation. Then and since, as chairman of the water-power development committee of the National Electric Light Association, he has untiringly worked to bring about far-sighted interpretations of these laws with workable rules and regulations so that the most beneficial results shall be gained.

H. C. Abell, who was re-elected treasurer of the N. E. L. A., is the chief engineer for the American Light & Traction Company, which is the holding company of the Muskegon (Mich.) Traction & Lighting Company, the San Antonio (Tex.) Public Service Company and many light and gas properties.

Attorney Elected President

Jack Beall to Complete Texas Interurbans Left Unfinished by the Late Colonel Strickland

A brief item published last week announced that Jack Beall, former Congressman from Texas, and for the last six years one of the general attorneys for the Texas Electric Railway and other interests of the late Col. J. F. Strickland, has been elected president of the Texas Electric Railway to succeed Colonel Strickland at the meeting of the board of directors in Dallas on Monday, June 6. At the same time the board created a new position, that of chairman of the board, and elected to this post N. A. McMillan, St. Louis, executive manager of the First National Bank of that city and head of the St. Louis Union Trust Company. Mr. McMillan has been closely associated with Colonel Strickland in financing the building of the interurban lines and also in his other enterprises. Two vacancies on the board of directors were filled by the election of C. G. Comegys, of the city of McKinney, and Burr Martin, Dallas.

JACK BEALL

Mr. Beall took over his duties as president of the Texas Electric Railway immediately after his election. He has announced that he would carry out the same general policy that Colonel Strickland had followed, and asked the co-operation of all employees of the company. The first important work left unfinished by Colonel Strickland to be taken up by Mr. Beall is the building of the interurban line to Terrell. Work on grading for this line has already begun, and Mr. Beall says work will be rushed and the line completed as soon as possible.

Mr. Beall is a native Texan, having been born a few miles west of Waxahachie on Oct. 25, 1866. He was educated in the country schools of that district and later taught school for several years before he entered the University of Texas in 1886. He was graduated from the University of Texas in 1890, taking his degree in law. He then entered the practice of law at

Waxahachie and was elected to the Texas Legislature in 1892 and to the State Senate in 1894. Mr. Beall was elected to Congress in 1902 and served continuously as representative of the Dallas district until March 4, 1915, when he resigned to take over his duties in the legal department of the Texas Electric Railway.

Appreciation of Mr. Brooks Shown at Testimonial Dinner

Frank W. Brooks, retired president of the Detroit United Railway, was given a testimonial dinner at the Detroit Athletic Club on the evening of June 8. About 600 officers and employees of the company, among whom were present several who have been with the company over thirty years, expressed their appreciation of Mr. Brooks. As tangible remembrances, the employees presented their resigning leader with a grandfather's clock, a diamond ring and an engraved testimonial, which recites Mr. Brooks' personal merit and his efforts in behalf of the company.

Besides selected guests, Elliott G. Stevenson, counsel for the D. U. R.; Alex Dow and John C. Donnelly, directors; Allen F. Edwards, acting president; J. C. Hutchins, chairman of the board, and E. J. Burdick, assistant general manager, were seated with Mr. Brooks.

F. W. Miller has been appointed superintendent of the Hartford Division of the Connecticut Company, the place made vacant recently by Nathaniel J. Scott when he succeeded the late Warren P. Bristol as manager. Mr. Miller has been with the company thirty years and has worked his way up to his present position. John A. Kiely, who began twenty-five years ago as a motorman and was successively inspector and chief dispatcher, has been appointed assistant superintendent. William W. Melaven has been made general barn foreman. These are the appointments of Manager Scott.

Edward C. Connor, who has been chief engineer to the supervisor of public utilities of the city of Dallas, Tex., tendered his resignation on May 1. The resignation was accepted by John W. Everman, supervisor, but an appointment to the vacancy has not been announced. Mr. Connor is one of the best known civil engineers in Dallas and his work as chief engineer to the supervisor of public utilities has covered valuation of the traction company's lines in connection with the company's application for a fare increase, negotiations looking toward the drafting of a new franchise for the Dallas Railway and the carrying out of the commitment of the traction company in connection with the building of another interurban line into Dallas, which was recently begun and which will extend to Terrell. It is rumored that W. J. Powell, former city engineer, will be tendered the place.

W. O. Wood President

Queens County Railway Official Elected at New York Meeting Last Week—Eighteen Years in New York

At its annual meeting at Lake George on June 11 the New York Electric Railway Association elected as president one of the best-known railway men in the country. This is William O. Wood, whose fund of humor is equally well recognized with his ability as a railway operator. Mr. Wood is president of the New York & Queens County Railway, a position which he has held since 1908. He is also vice-president and general manager of the Long Island Electric Railway and the New York & Long Island Traction Company. All of these properties are affiliated with the Interborough group in New York.

Mr. Wood succeeds T. C. Cherry, vice-president and general manager of the Rochester & Syracuse Railroad, as head of the association. Mr. Wood has long taken an active and forward participation in the work of the state body and his election to the office of president is a recognition of his services and interest in behalf of the organization. During the past year he served as first vice-president of the New York Association.

W. O. WOOD

Mr. Wood began his electric railway experience in 1900 when he was appointed general superintendent of the Rapid Railway in Detroit. From that city he went in 1903 to Brooklyn, where he became superintendent of the elevated lines of the Brooklyn Rapid Transit Company. The following year he was appointed assistant general superintendent of the company. In 1907 he resigned to become associated with the Interborough Rapid Transit Company and for a year was engaged in special work, reporting to President Shonts.

Mr. Wood was born in Evansville, Ind., and prior to being connected with the electric railway industry was for a time with the Louisville & Nashville Railroad, then with the Flagler lines in Florida and later with the Illinois Central Railroad.

Obituary

Judge Ira B. Mills, chairman of the State Railroad & Warehouse Commission of Minnesota, and a former president of the National Association of Railroad & Public Utility Commissioners, died in St. Paul on May 4 at the age of seventy. Judge Mills was the oldest public utility commissioner in the United States in point of service, having been in office since 1893.

James O. Ellis, manager of the Chelsea Division of the Eastern Massachusetts Street Railway, died on June 9. He was 51 years old. He was born in Brooks, Me., Aug. 19, 1869, and began railroading as a driver of horse cars on the Lowell division of the Lynn & Boston, the former name of the Eastern Massachusetts Street Railway. He became an inspector and finally rose to the position of superintendent of the Reading Division. Nine years ago he was made superintendent of the Chelsea Division, succeeding George H. Gray, who was made general superintendent. The Chelsea Division includes lines in Revere, Chelsea, Malden and Melrose.

William W. Magoon, formerly general manager of the Ohio Valley Electric Railway, Huntington, W. Va., and one of Huntington's most prominent citizens, died recently in Kenova. Mr. Magoon went to Huntington about thirty years ago from Vanceburg, Ky., to build an excelsior plant, but later became identified with the Camden Interstate Railway. He was general manager of the Ohio Valley Electric until about five years ago, when he resigned because of ill health. He was also secretary and treasurer of the Blue Jay Manufacturing Company, which is one of the largest overall manufacturing concerns in the world. He was also secretary of the Huntington Credit Men's Association. He was one of Huntington's most active workers and boosters, and he devoted much of his life along those lines.

Edgar M. Graham, consulting engineer in Muskogee, Okla., was killed May 14 in an automobile accident. For more than ten years Mr. Graham was chief engineer of the Muskogee Electric Traction Company. He built during this time about 10 miles of the Webbers Falls Railway. In 1900 he became assistant to Guthrie & Diehl, consulting engineers, Buffalo, N. Y. The following year he went with the New York Central Railroad and then was with the Lackawanna Steel Company for two years. In 1905 he became chief draftsman for the Buffalo & Susquehanna Railway, and in 1907 was made assistant chief engineer. He entered private practice in Buffalo in 1908. Mr. Graham was forty years old. He had long been active in engineering society affairs.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Crossarm Buying Shows Some Increase

Greater Demand May Be Due to Lower Prices—Cut of 10 per Cent This Month

Whether it is due to recent price decreases or not is uncertain but producers report that buying of crossarms shows quite an increase of late. This increase in demand is not noted in the electric railway field, however, as it centers around central station buying. Demand is still far from normal but producers are encouraged that it should show up as well as it does.

There may be some connection between current buying and the price situation for on the first of this month a general cut on longleaf yellow pine crossarms was made amounting to about 10 per cent. Fir crossarms were not affected by the drop. This is not the first price decrease on crossarms this year as a cut amounting to 15 per cent was made on Feb. 1 and another varying from 9 to 15 per cent on March 1. These covered both fir and pine arms.

Stocks are reported to be good with immediate shipments prevailing. Producers are optimistic that the market will open up considerably more during the latter months of the year.

Stocks of Waste Are Not Extra Large

Textile Mill Shutdown Has Curtailed Supply—Prices Are Down, but Buying Shows Little Improvement

With textile mills either shut down or very nearly so for several months past it is doubtful if there is a very great surplus of waste in the country. The raw material of waste is a by-product of these mills and, furthermore, waste manufacturers have held their stocks down in line with current business conditions. At the present time deliveries are immediate but only because demand is low and orders too small to push shipments. There has been a slight improvement reported in the textile situation in New England recently but operation there is still very spasmodic, and it is a question whether or not an increase in demand would not push deliveries on waste.

It seems unlikely that any such increase in buying will materialize for some time, however; not before the last quarter, producers think. The general market situation is quiet with railways buying from hand to mouth and industrial demand, which is usually very considerable, flat. One producer at least reports slight signs of increased activity but others do not confirm this.

Competition is very keen and prices are down accordingly. Within the past month quotations have been lowered one cent per pound at least. Current quotations from several waste manufacturers in lots of 100-lb. bales show on white cotton waste a range of 7 to 12 cents per pound; on colored a range of 5½ to 10½ cents, and on wool waste the price varies from 8 to 17 cents.

Recent Price Cut on Pole Line Hardware Not General

Buying Shows No Reaction, Although Three Reductions Have Been Made This Year—Deliveries Are Immediate

Although one producer of pole-line hardware has just made a 5 per cent price reduction effective June 16, and a large manufacturer's distributer reduced the price 5 per cent about a week ago, there has been no general recent decrease so far as can be learned. Manufacturers in this line have apparently reached the conclusion that price cuts will provide absolutely no stimulus to buying, consequently reductions represent lower costs and nothing more. Three general price cuts have been made since the first of the year and buying has shown little or no reaction. The first cut of 5 to 15 per cent was made in late December and early January, the second of 5 to 7½ per cent on Feb. 15 and the third from 7½ to 10 per cent occurred on April 11.

At the present time there are a few orders and inquiries coming in from central stations but none from electric railways. Stocks have been reduced, one producer who had $500,000 worth of goods on hand earlier this year having cut this down by one-third now, but deliveries are mostly immediate and not longer than one week at the most.

150 More Cars for Detroit

In line with the tremendous construction program under way on the municipal railway system of Detroit, Mich., the city has advertised for bids on 100 safety cars and fifty double-truck Peter Witt cars. Bids are to close on June 28, the company advises. On Nov. 16, 1920, the railway ordered twenty-five safety cars from the Osgood-Bradley Car Company and on April 15, 1921, purchased twenty-five additional safety cars from the same concern. An order for rails and kindred material which the city placed last month, totaling about $800,000, was mentioned in the May 21 issue.

Bituminous Coal Production Holds Up Well

Current Average of 8,000,000 Tons Weekly More Than Present Light Demand Can Absorb

Possibility of a shortage of bituminous coal materializing this fall seems more remote in view of the consistent maintenance of current output. For the past four weeks production has proceeded at the rate of 8,000,000 tons per week according to the Geological Survey, or about 2,000,000 tons above the low point reached early in April. Incidentally this rate of output, *Coal Age* states, is considerably more than can be absorbed under present industrial conditions.

Buying has been restricted to the barest needs, though some forward contracts have been closed. Consumers are still holding off under hopes of lower freight rates and reductions in the price of coal, and this policy is encouraged by the facility with which needs can be filled. It is stated that there will be no general reduction on coal freight rates this year, however. The Secretary of Commerce this week gave it as his opinion that nothing will come of the negotiations between the administration and the railroads looking to a reduction of freight rates on coal. There may be local changes, of course, but they will be made only by rate hearings and after considerable delay.

EXPORT BUYING LIGHT, WITH END OF BRITISH STRIKE NEAR

The export market is dull at the present time as purchasing on British account has slumped in anticipation of an end of the coal strike in Great Britain next week. As a result of the weak condition of the steam coal market prices have further eased off recently. The index of spot coal prices of *Coal Age* declined to 95 on June 14, the lowest figure touched this year. This number represents all prices reduced to one figure and compared with the average government price of 1918 which is taken as 100. The first of the year this index number ranged around 130 but since February it has remained in the neighborhood of 100.

Labor costs at the mines are as yet undiminished. All efforts to open discussion with the United Mine Workers for wage reductions have thus far failed and no prospect of a cut in union wages can be seen this summer. Further than that, of course, the situation is uncertain. Meanwhile, non-union coal produced at lower wages continues to offer keen competition to union coal in the eastern market.

New and Scrap Steel Market on Lower Level

Price Reductions of from $3 to $5 on New Steel Products Fail to Move Much Material

It is felt that the iron and steel trade is operating on a level that is about as low as it can go. A figure of 25 per cent will just about indicate the rate of operation of Corporation and independents together, a figure 5 points lower than it was a week or two ago. With a generally lower volume of business this past week the general tone of the market is softer and some definite price reductions in certain steel lines have been noted.

Iron bars are off 13 cents a hundred pounds to $2.25 and in New York the reduction is 15 to 20 cents to $2.23 to $2.28. Steel bars at Pittsburgh are holding at 2.10. In the sheets black, Pittsburgh, is down $3 a ton to 3.85 and blue annealed is down $4 to 2.90. On plain wire quotations are now 2.75 and on galvanized barbed 3.85 cents, $5 a ton lower than recent prices. Malleable at Chicago is 50 cents lower at $22.20 per gross ton while Pittsburgh bessemer is $1 lower at $24.96. Prices are being shaded on track spikes, quotations on which are $3.40 base, Pittsburgh. Base on track bolts is $4.35, and here too is some shading, probably of $3 per ton.

Since June 7 the scrap iron and steel market has dropped from 50 cents to $1. Old steel axles are $1 lower to $13.50-14.00 and No. 1 cast is $1 lower to $13.00-13.50, all in net tons, Chicago. Old iron axles are steady at $24-25. In gross ton lots, Chicago, 50-cent reductions have been applied to car wheels, bringing them to $13.50-14; R.R. malleable, which is now $13.50-14; frogs, switches and guards, which stand at $11-11.50; old steel rails, short, which are quoted at $12.50-13, and rerolling steel rails, $13-13.50. Buying in this market is extremely quiet.

Insulation Makers Optimistic Despite Light Buying

Good Price Declines of the Past Week Bring Total Decline Since First of Year to Large Figure

Quietness is still the prevailing feature of the electrical insulation market. Repair shops are buying hand to mouth, for most of them are not busy. Industrials are operating at reduced capacity, and furthermore they ordered ahead when deliveries were long so that little buying is being done in that quarter. Electric railways are endeavoring to get along on such insulating material as they have and buy only for immediate needs, and as the appliance industry has been slack for a long time, small motor manufacturers are not active. One of the latter, for instance, recently bought 15 lb. of mica where a normal order formerly totaled 100 lb.

The general outlook is held to be far from discouraging, however. The very fact that motor manufacturers, electric railways, etc., are not stocking insulation means all the more potential business yet to be placed, and as it seems there is not a great volume of repair work being done insulation needs along that line are piling up. Just when this business will break is, of course, a question, but the majority of producers are not expecting anything much to develop in the way of increased business before the first of September.

Buyers apparently do not yet have confidence in present prices despite the radical reductions which the latter have undergone. Prices are still declining, it is true, but it is possible this is largely a result of conditions of keen competition. Since the first of this year, according to one of the large producers, cotton tapes, webbings and sleevings have declined 70 per cent, 25 per cent of this drop occurring just this week; varnished cloths have declined about 28 to 35 per cent, one-fourth of which decrease also was made this week; cotton armature twines, except linen, are down 33⅓ per cent and insulating varnish about 20 per cent. India mica up to the present is undiminished in cost as the price at the mines has not been reduced, but the South American product is now somewhat lower.

Conditions of stock vary considerably, though all producers are pursuing a policy of keeping down inventories and only producing on order. Deliveries of standard material for the most part are immediate, as in general stocks are too large rather than too small under present buying.

Schedule Material Prices Marked Lower Last Week

From about the ninth to the thirteenth of June the various manufacturers of schedule materials increased some of their discounts and lowered certain list prices so that the general result was a decrease in prices averaging around 10 per cent in standard-package quantities. With this general easier price, however, it can hardly be expected that any great amount of business will be stimulated, for the building construction outlet is not yet in a condition to absorb any large amount of schedule material and wiring devices.

Fuse Prices Down 11 to 17 per Cent the Past Month

With the recent price reductions announced on non-renewable fuses by several manufacturers, quotations on both this type and on renewable fuses are now down. Effective the middle of May, leading manufacturers reduced prices on renewable fuses approximately 17 per cent by increasing the discount allowed to distributers 10 points.

Non-renewable fuses were not affected by this drop, however, but the first of this month reductions were made by a couple of manufacturers. Other producers have since then taken similar action, until with further decreases that did not come through until last week non-renewable fuses may be said to have been generally reduced from 11 to 16 per cent this month.

Hydro-Electric Development Proposed for Jamaica

Plans are under consideration at present for the construction of a hydroelectric plant in Jamaica, to cost about £614,740. The present plans provide for a 6,000-kw. development, to include the erection of three power stations equipped with a water turbine directly connected to a three-phase alternating-current generator. Transmission will be both by underground cable in one section and by overhead lines to a main line along the railway. The project also includes the electrification of the railways on the island.

Franchises

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—The Galesburg Railway, Lighting & Power Company has been granted a franchise to construct, maintain and operate a street railway on South Henderson Street from Knox Street to Monmouth Boulevard. The new franchise will help the company to connect its interurban lines. Work on the new extension has already been started.

Track and Roadway

Tri-City Railway, Rock Island, Ill.—The Moline City Council has instructed City Attorney James M. Johnston to petition the Illinois Public Utilities commission to issue an order compelling the Tri-City Railway to put in new tracks on Fifteenth Street from Eighth to Twenty-fourth Avenues, so that the city may advertise for bids for the paving of the street with brick, with the assurance that the railway will not hold up the work, by refusing to put in new rails.

Southern Indiana Gas & Electric Company, Evansville, Ind.—An agreement has been reached by the Southern Indiana Gas & Electric Company at Evansville, Ind., with the city whereby the company will improve three streets in that city, according to a recent announcement of Mayor Benjamin Bosse, of Evansville.

Interstate Public Service Company, Indianapolis, Ind.—The Indiana Public Service Commission has refused to declare unreasonable an ordinance passed by the city council of Shelbyville ordering the Interstate Public Service Company, Indianapolis, Ind., to make improvements and extensions. The company has appealed to the commission to disapprove the ordinance.

Public Service Railway, Newark, N. J. — The Public Service Railway has been asked by the City of Burlington, N. J., to lower its tracks through the entire city in order that street paving might be started. The work of lowering the tracks will require some time.

Interborough Rapid Transit Company, New York, N. Y.—The new Rapid Transit Commission, New York, N. Y., is preparing plans for the extension of the Queensboro subway from Gilroy Avenue and the Willets Point Boulevard, Corona to Main Street, Flushing. The Board of Estimate has already authorized the extension of the Corona line from the present station at Alburtus Avenue, Corona, to the new storage yards.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio.—The Columbus, Delaware & Marion Electric Company has secured permission from a majority of property owners in Indianola Avenue to lay double tracks for a distance of 800 ft. to Oleantangy Street. The Council is expected to act on a 20-year franchise ordinance permitting the work.

Johnstown & Somerset Railway, Somerset, Pa.—Work will be resumed on the construction of the Johnstown & Somerset Railway which was suspended during the war though six miles had been completed. The line has been operating for a year. In view of the reduced cost of material and labor the board of directors has decided to push the project through. Four miles from Holsopple to Jerome will be finished within 90 days. Engineers are busy now on the line from Jerome to the Lincoln highway via Boswell.

Montreal (Que.) Tramways. — The Kelly Street extension of the Montreal Tramway service will be completed shortly, and the new service from Ahuntsic station to the Canadian Pacific Railroad at Bordeaux will be commenced early in June.

Tacoma Railway & Power Company, Tacoma, Wash.—Frank R. Spinning, ation earning basis, and that the city State Department of Public Works, has announced that he will do all within his power to see that the College of Puget Sound is provided with street car service, urging that the line be obtained by friendly and co-operative means. The Tacoma Railway & Power Company, through Manager Richard T. Sullivan, proposed that the company will build the extension, if the city will remit gross earnings tax to the amount of any deficit that occurs in the operation of the line, figured on an 8 per cent earning basis; and that the city relieve the company of its paving obligations on Portland Avenue when that street is paved. Mayor C. M. Riddell pointed out that the city charter absolutely prohibited the Council from agreeing to any such proposition.

Power Houses, Shops and Buildings

Terre Haute (Ind.) Traction Company.—The Terre Haute Traction Company is preparing to ask the Public Service Commission for permission to finance a $500,000 enlargement and extension of the Water Street power house. The report adds that an imposing $200,000 traction terminal for Terre Haute is also in mind, for which plans have been prepared some time. Under a recent grant of increased rates the company contracted to spend all of the additional income provided in betterments. The new power generating machinery here will be the first step toward complying with this contract, and the terminal station will come along soon after.

New York, Westchester & Boston Railway, New York, N. Y.—Plans are expected to be filed with the Public Service Commission of New York by the New York, Westchester & Boston Railway providing for establishment of a new terminal at 129th Street and Third Avenue, which will cut 15 minutes off the running time between Westchester villages and downtown New York. A through express service to lower Manhattan will be available under the plan by connection with the Third Avenue L at 129th Street.

Trade Notes

The Clark-Hunter Company, Inc., 161 Summer Street, Boston, is now manufacturing the Duwell motor-driven bench grinders at its Worcester factory.

The American Metal Molding Company, Newark, N. J., is now producing a full line of conduit elbows in addition to its flexible armored conductor and metallic flexible conduit. Sufficient factory capacity also is available to turn out special press work for the commercial trade.

The Schiefer Electric Company, 614 City Bank Building, Syracuse, N. Y., has been appointed to represent the Condit Electrical Mfg. Company, Boston, Mass., handling its complete line in the vicinity of Syracuse and the eastern part of New York State exclusive of New York City.

Power Specialty Company, 111 Broadway, New York City, manufacturer of Foster superheaters, economizers, and oil stills announces that it is just completing the expenditure of about one-half million dollars in the enlarging of its works, including new steam power plant and new forge shop.

The Westinghouse Electric & Manufacturing Company has announced the opening of its service department and repair shop at 1535 Sixth Street, Detroit. It is a five-story building and similar to the sixteen buildings erected in the principal industrial centers of the United States for repair purposes. The new repair shop is equipped to handle the designing and manufacture of all types of switchboards in the same way as they would be handled at the main works, and in addition dipping tanks and baking ovens are available. Stocks of repair parts are carried. The company's engineering organization, it is stated, is prepared to install or repair electrical or steam apparatus on the owner's premises.

Ohmer Fare Register Company, Dayton, Ohio, states that there is a continuously increasing demand for Ohmer register service on city lines. Among recent large contracts placed with the company is an order from the Georgia Railway & Power Company, of Atlanta, Ga., for equipping its entire city property with 418 Ohmer No. 3 type, time-feature, totalizing registers and rapid transit operating equipment. This corporation has also given to the Ohmer Company other contracts for equipping its interurban divisions with registers. The Shreveport (La.) Railways Company has likewise placed a long-term contract for the installation of 44 No. 3 type, time-feature, totalizing registers with rapid transit operating equipment for use on all of its city lines.

New Advertising Literature

Steam Separator. — The Griscom-Russell Company, 90 West St., N. Y. City, has issued bulletin No. 1140 describing its "Stratton" steam separator.

Damper Regulator.—The Atlas Valve Company, 282 South Street, Newark, N. J., has issued bulletin No. 5, describing its Victor damper regulator No. 3, high-pressure.

Headlights.—The Electric Service Supplies Co., Philadelphia, Pa., has issued a limited number of copies of its new engineering report, No. 351, on glass reflectors for headlights.

Electric Drill.—The Louisville Electric Manufacturing Company, Louisville, is distributing a circular covering its No. 3, two-speed, and No. 2, single-speed "Universal" electric drills.

Arc Welding.—"Electric Arc Cutting and Welding by Alternating Current" is the title of a new fifty-two-page publication of the Electric Arc Cutting & Welding Company, Newark, N. J.

Belt Conveyor Idler.—C. W. Hunt Engineering Corporation, 143 Liberty St., N. Y. City, has issued a folder describing its new self-aligning, all-steel, troughing, belt conveyor idler.

Bench Grinder.—The Clark-Hunter Company, Inc., 161 Summer Street, Boston, is distributing a four-page leaflet describing the "Duwell" motor-driven bench grinder.

Electric Welders.—Bulletin No. 1 issued by the American Electric Fusion Corporation, 1906 North Halsted Street, Chicago, describes its type "VW" vertical welders.

Multi-Phase Renewable Fuse. — The Federal Electric Company, Chicago, has developed a multi-phase time-limit renewable cartridge fuse designed to prevent polyphase motors running single-phase.

Electric Hoists.—The Electric Hoist Manufacturers' Association, 165 Broadway, N. Y. City, has issued an illustrated bulletin on "Approved Applications of Electric Hoists," with a separate bulletin inclosed entitled: "Monorail Runway Construction."

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
DONALD F. HINE, Editorial Representative A. D. KNOX, Editorial Representative GEORGE BUSHFIELD, Editorial Representative
G. J. MACMURRAY, News Editor

Volume 57 New York, Saturday, June 25, 1921 *Number* 26

Government Reorganization Plans Show Signs of Life

PRESIDENT HARDING and his committee on the reorganization of the executive branch of the government appear to be making progress in formulating concrete plans and recommendations to present to Congress. Latest reports indicate that the President's principal recommendation is that bureaus and agencies be grouped according to their major purpose and that the purpose of each department be clearly defined. The committee says that it is already working along this line and reports of its own plans indicate that it has gone straight to the point and suggested a concrete grouping which is logical and which really is according to the President's definition.

All this is good. But it is a long way from such a proposal to an enacted law. The public must express itself, meanwhile, if results are to be obtained. As previously pointed out in these columns, pressure from his constituents is the most determining influence on a Congressman's vote.

This subject should be watched and pressure exerted when and where it will do good. The electric railway industry should benefit as much as any from the effects of an enlightened public consciousness of better economy and efficiency in governmental business. More important, this is the sort of thing that should be done and it deserves active support from individuals who should write to their Congressmen urging *action.*

The Bus, Like the Early Railway, Develops New Territory

TERRITORIAL expansion of communities can be accomplished only by some means of universal transportation. In the early '90s this was the field to which the promoters and developers of the modern, present-day electric railways directed their energies with so much success—not, perhaps, in the way of profit to themselves, but certainly in advancing the welfare of the community. They could not foresee the increased costs that have been placed upon these railways in the past half decade, either rendering them barely self-supporting or actually putting them on the scrap pile.

The large investment needed today to build railways precludes much if any extension until these construction costs can be reduced. But that transportation where it is needed will be furnished somehow, by individual operators or otherwise, is obvious when the many bus routes in the country are studied.

In this issue mention is made of a real estate development in Akron, the success of which depended solely upon having means of transportation. In order that the home owners in that territory might be able to get back and forth to their work and pleasure with some degree of ease and without walking a half mile or more to the nearest trolley car line, it was but natural for the promoters of the new addition to solve the problem themselves.

Thus it will go—when the need for transportation arises. The same form of development will occur in the '20s as did in the '90s. Transportation promoters will not, however, in this day and time put in the most expensive installation, but will carefully analyze the cost of doing business and will install that form of system which will give the greatest service at the minimum of expense. It may, at first, be a light-weight bus on a leisurely schedule; later on, a more elaborate bus proposition or a trackless trolley car, and then, when traffic becomes permanent and stable enough to warrant a larger investment, the trackway will provide the route.

Stand Up for Your Legal Rights, but First Educate the Public

THIS was the advice given to the managers of the New York State electric railway properties at their recent annual meeting by Judge John A. Barhite, formerly Public Service Commissioner of the State. According to the speaker the utility companies are apt to forget that their chief obligation to the public is to supply good service. There is a power, he said, which can change a franchise when constitutional rights are involved. This power, of course, may be exercised to protect either party to the contract.

This advice of Judge Barhite should not be overlooked. Railway men are too accustomed to think of a franchise rate as unchangeable, no matter what the conditions are under which it was granted or the time which it was supposed to run. In this impression, of course, they are like the public. There are a great many citizens who consider a franchise rate, at least when it is low, as sacrosanct. In no circumstances, according to them, can it be changed without the consent of the people served or their local representatives, no matter how long ago the rate was made or how conditions have changed since it was established.

In the address at the Lake George meeting to which reference has been made the speaker very wisely pointed out the duty of the utility operators, where cases of unremunerative rates exist, to explain to the public the rights of the utility in cases of this kind. A process of education of the public in cases of this kind is highly desirable. This explanation of the facts of the case should not be left until a crisis arises, as the process is one requiring time. This time should be shorter, however, than formerly, because of the many instances of rate increases during the past three or four years throughout the country, so that the public is better informed now of the legal status of rates.

While the legal situation was clearly defined at the Lake George meeting, railway companies should also realize that while, in certain circumstances, courts and commissions can raise rates, their power in one respect is very definitely and absolutely limited. They cannot compel the people to take the service at the charge permitted. For example, in transportation, when the rates are considered too high, the public or a portion of it has the option of walking and perhaps of riding in jitneys and private automobiles. In other words, on many properties the legal limits are not the only ones which control a fare. Commercial considerations must also be taken into account. This affords still another reason for the educational program of publicity urged by Judge Barhite.

Eyes Are Again on Richmond; This Time the Trackless Electric Car

IT IS a marked coincidence that the trackless trolley exhibited at Schenectady on June 15 should be destined for Richmond, Va., where the first commercial electric line in this country was put into service. The trackless trolley is not new, as it has been operated to a considerable extent in foreign countries, but the rapid development of the automobile on the one hand and of the safety car on the other has made it possible to design a modern machine of this type that has great possibilities. In the trackless trolley vehicle that was exhibited at Schenectady is found a bus that is a combination of the good things of both the automobile and the electric railway car. By adopting the automobile chassis it is possible to eliminate expensive track construction and paving with its steel rails and fixed way, along with the weight and objectionable noise of metal wheels and grinding brake shoes. By adopting the pay-as-you-enter safety car body there is retained its desirable features in handling passengers and collecting fares. By adopting the electric motor as the drive no new maintenance problems of gasoline motors, with their clutches and transmisions, are introduced. And this is not all; the Schenectady trolley bus will, it is said, operate at a cost at least as low per car-mile as any automobile bus or electric car yet developed, and it is, therefore, economically sound.

Now what is the field for this new trackless trolley? There is of course no ground to assume that it is going to replace the electric car or the gasoline bus under all conditions, but its practicability for new extensions and feeders to electric lines is at once apparent to all. Then there are those thousands of communities in this country that have grown faster than the electric railway facilities. There are also those communities whose growth has not been in the directions anticipated. It is not unusual to find examples in which a car track may be on one side of a town, which was the proper place for it when first constructed, but now all the development has taken place on the other side. Simply by the erection of a pole line and trolley, the trackless trolley may be run through the newly populated section and then over the route where there are already tracks and the original trolley line; in fact, the trackless trolley car may be sandwiched right in with the regular cars. Again, there is the single-track line that should have more service, but on which it is impossible to put any more electric cars on account of the lack of the necessary turnouts. Maybe the expense is too great to make it pay to install the other track with paving costs added, or it is not possible to get the extra track at all on account of the necessary franchises. But, with the trackless trolley, all that is necessary is to install an additional wire and operate additional service.

No doubt there will be improvements made on the trackless trolley as shown at Schenectady on June 15. But the fundamental idea is sound and the trackless trolley bus will undoubtedly be a factor in the transportation of the future.

Patrons Converted Into Defenders of Road

CONTROVERSIES often rage over trifles. Every commuter knows this. It is borne in upon him from all sides. It is his pride in his home town, his pride in his garden, his pride in his isolation, that makes the commuter quick to resent any implication that he and his are not the best. All this is highly desirable, more so when this tendency jealously to guard the things he considers peculiarly his own manifests itself in the defense by the commuter of the railroad that carries him back and forth daily.

This is just what has happened in New York. The Transit Commission there has been giving out figures of passenger movement, claiming for the Flatbush Avenue Station of the Long Island Railroad the heaviest suburban traffic. Last year 33,966,092 passengers passed through that one portal to the metropolis. This is certainly a formidable army of the suburban species, but it does not constitute a record. At least Lewis Saxby says so. And in substantiation this commuter-stockholder-statistician contends that even the combined traffic of the Grand Central Station and the Pennsylvania Station is about 22,000,000 passengers fewer per year than the traffic of the Hudson tubes.

Few places there are that have figures to offer to compete with these imposing and, to some of us, staggering totals, but then, as Dr. Einstein says, it is all a matter of relativity. The relativity may not be readily discernible. It seldom is. If it were, a professor wouldn't be needed to point it out, and the need would not exist for applying to it a term that probably Mr. Edison had to look up for its meaning when the savants dragged it forth into an unsuspecting world. But the relativity is there.

The Hudson & Manhattan Railroad, "Hudson Tubes," has been a personally conducted line ever since the days of William G. McAdoo. This has borne fruit. The case of Mr. Saxby is not an isolated one. It is merely another manifestation of the spirit that makes the rider on this line consider the property to be peculiarly his own.

If Mr. Saxby hadn't thrown down the challenge some one else would have taken up the cudgels in behalf of the railroad. Of this there is no doubt. And how much better it was for the company to have one of its patrons spring to its defense than for the company itself to sing its own praises! Readers of the ELECTRIC RAILWAY JOURNAL may not have any immediate concern with the totals of passengers involved in this controversy, but they do have an interest in the spirit of service behind the Hudson & Manhattan Railroad operation which converts patrons of that line into quick defenders of the road and all that it stands for in management and operation. Therein lies the lesson that may be well learned by others.

Careful Perusal of the Index May Save Waste of Effort

THE index appears in this issue. The publishers of this paper have always paid special attention to the compilation of the semi-annual index, and to insure the receipt of it by every subscriber a copy for each semi-annual volume is bound in with the last number of that volume. In consequence, the index for Volume 57 appears in this issue.

A few words as to the method of compiling the index may not be out of place. It is essentially one of subjects and not of titles. For this reason an article which discusses a number of subjects may have an equal number of entries in the index. Articles relating to individual companies are indexed under the names of those companies and a list of the principal key words which have been used is given in the instructions for the use of the index.

There are many ways in which the occasional reading of back copies of a periodical like the ELECTRIC RAILWAY JOURNAL will help the active worker in the industry and in such reading the index is a great help. One way, for example, especially with an industry which, like that of electric railways, has grown rapidly, is to disclose ways in which different problems have been approached. An engineer or transportation official to whom a problem is presented for solution may think that he is the first to whom this question has been presented, when actually it may have had to be considered in approximately the same form on other properties. This, if recorded in this paper, would be disclosed by the index, and the searcher for the answer to his question would find it had been considered in earlier years. Even if the problem were not the same in all respects, a new aspect and help may be gained by a study of the ways in which previous investigators have attempted to do the same work.

Another advantage of the occasional perusal of back volumes and indices is the perspective of the industry gained thereby. By the space given to different topics in both the bound volume and the index, one may be able without difficulty to appraise the importance which these topics seemed to have at the time. Often those that became relatively unimportant for a time appear again in the front rank, an example of the adage "history repeats itself." Patent attorneys declare that there would often be a saving in time and money spent in research to rediscover old inventions and resurrect old ideas if investigators first made a study of the prior knowledge of the art. This is undoubtedly equally true in the case of subjects and methods which have been found to be not patentable.

Still a third benefit of the practice of using the index and back volumes is to refresh the memory and to acquire information about events and methods the articles concerning which were not read at the time they were published. Whether this was because of a lack of time or opportunity, the result is the same. The quickest way for a person who has been out of the country or otherwise separated from the industry quickly to get an understanding of what has passed is to review the back copies and indexes of periodicals. In fact, any reader who binds his copies of the paper regularly and gets the habit of frequently consulting these bound volumes for specific topics by means of the index or looking over them, even if not in search of some definite data, will find that the numbers possess much of interest and value of which he had hitherto no conception.

Essentially the Interests of the Public and Electric Railway Are Identical

LAST week the Pennsylvania Street Railway Association held its annual meeting at Harrisburg; the gathering was large and the spirit of the discussion was good. However, there was nothing remarkable in the size and spirit of the gathering, as the same might be said, and is said, regarding many other meetings; the remarkable thing was the program. Included in the list of speakers were the president of the American Electric Railway Association (who spoke twice), the chairman and the chief engineer of the State Public Service Commission, the State Librarian, and the field secretary of the State Chamber of Commerce, not to mention some well known electric railway men.

Forgetting for the time being the excellent technical papers which were read and discussed, the industry can gain much from a study of the addresses of these speakers from outside of the association. Abstracts of their addresses as well as of the other proceedings of the meeting will be given in an early issue of this paper. The impressive thing about the whole discussion on public relations was the way in which the fundamental unity of interest of utility and patron is coming to be understood. To illustrate: Chairman W. D. B. Ainey of the State Commission showed in his address that the welfare of the electric railways is a matter of real concern to this regulative body, which is handicapped in its constructive task in part by the contracts which the railways themselves entered into in the early and supposedly palmy days, and by the lack of provision for financial jurisdiction as regards the issuance of securities. Dr. F. H. Snow, head of the engineering department of the commission, also showed a sympathetic interest in the welfare of the utilities, pointing out how intimately the local and national problems in this field are related. President P. H. Gadsden of the American Association, speaking from the railway point of view, demonstrated that in permitting economic conditions to exist which make it impossible for the railways to extend and otherwise improve service the public is hampering its own development. He saw difficulties ahead in the direction of getting new money, but was optimistic with respect to the future, if the public will allow a reasonably liberal and prompt payment of the deferred returns to the holders of securities. Finally, D. M. Casey of the State Chamber of Commerce pleaded the cause of the electric railway as if he had been a railway man himself. His theme was really the essentiality of electric railway transportation, and he presumably reflected the attitude of the modern business man toward this vital public service.

All this is very encouraging, especially if it gets to the ear and eye of the public. The electric railway man may well pass on to his patrons the good things said of the utilities by their own representatives, as well as the inside facts of the business which only the electric railway men themselves know at first hand.

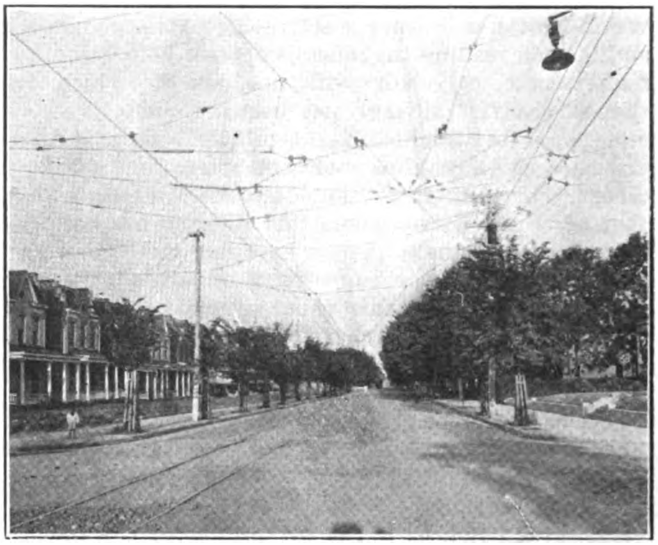
Quotation from the Federal Electric Railways Commission Report

No. 26

WITH capital and labor performing their respective parts freely and well, restrictive regulation would be unpopular, and the demand for the substitution of public ownership and operation for private management would shrink into relative insignificance. The test of private ownership and management lies in the solution of these two problems of credit and co-operation. These problems must be solved, and if no solution is practicable under present ownership and control, then the only course open is the complete transformation of the electric railway industry into a governmental business. Each member of this commission believes that credit can be secured and private operation maintained under public supervision.

Pioneer Trackless Trolley Installation

The Experimental Richmond Trolley Bus Operates in Conjunction with Rail Service to Demonstrate Its Worth and Flexibility and to Compare Costs of Operation Under Like Circumstances—Details as to the Construction of the Bus Compare Favorably with the Modern One-Man Car—A Special Type of Overhead Construction Needed for Its Operation



UPPER END OF BUS ROUTE ON FLOYD AVENUE, RICHMOND, WHERE BUS TURNS BACK

THE trackless trolley bus tested in Schenectady on June 15, as described in the issue of this paper for June 18, has been put in operation in Richmond, Va., by the Virginia Railway & Power Company. In May, 1888, thirty-three years ago, that city saw its first electric car. Now in 1921 the transportation world looks to the same city for information regarding the operation of the trackless trolley.

While this is not the first installation in this country of a rail-less vehicle propelled by electric motors taking power from two overhead wires, it is nevertheless the pioneer installation where a trackless vehicle has been used. The "Trollibus," so called by its builders, the Atlas Truck Company, has a body somewhat similar to that of the standard safety car mounted on an automobile chassis of special design.

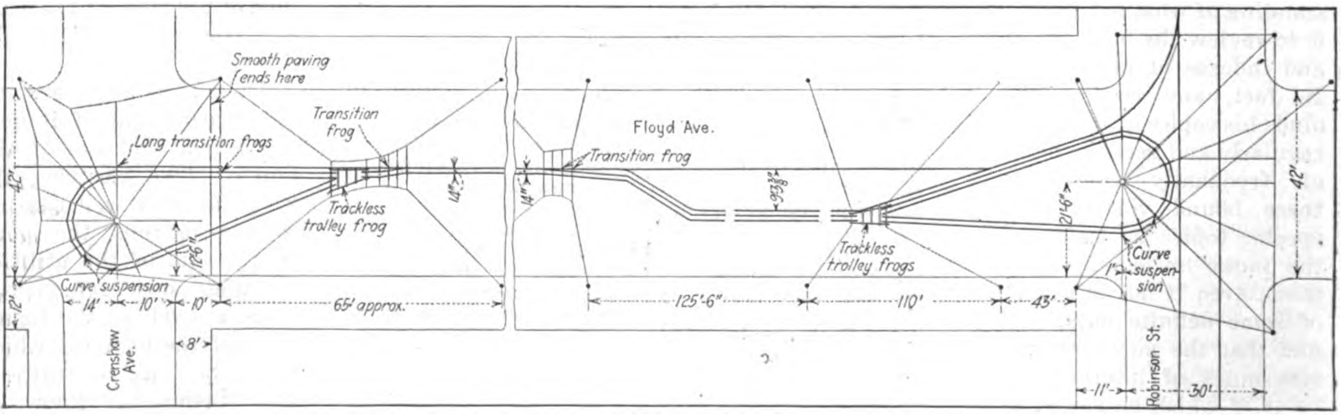
The vehicle, according to C. B. Buchanan, general manager of the railway company, who is largely responsible for its design, can very readily be converted to operate over a grounded track return circuit such as is found in almost universal use throughout the country today. To accomplish this it is only necessary to replace the solid rubber tires with steel flanged rims to fit the track gage and substitute for the sliding contact shoes on the trolley a wheel or shoe to take current from the overhead trolley wire.

The machine as built, however, will operate on a track return circuit, even though equipped with rubber tires, by having an adapter, so called, attached to the collector for connection with the standard overhead trolley wire and engage a shoe which fits into the trolley track groove to give the necessary ground connection.

The route in Richmond over which the "Trollibus" operates is purely for determining its possibilities and extends along Floyd Avenue, a street over which the Country Club car line also operates. A negative wire has been installed on this route for a distance of one mile, so that the bus really supplements rail service on that part of the route. Among the reasons for supplementing the car service was to demonstrate the ease with which the rail-less vehicle could maneuver in traffic, as well as to compare its cost of operation and popularity with other transportation units. Cost analyses as to operating expenses are being made from all operating data and a careful check is being kept of the passenger traffic in order to obtain an index as to its popularity. Operation over this route also gives the city officials an opportunity of deciding for themselves whether or not other permanent routes should be approved for operation solely with this type of vehicle.

The "Trollibus," which resembles very closely the one-man prepayment car in that each has the same seating capacity, combines several of the good features of light-weight body construction, electric motor drive, mechanical door control and prepayment fare collection with the flexibility of the automobile chassis and to some extent the mobility of self-propelled vehicles, to furnish ammunition with which a railway company can combat free lance competition with a minimum of investment and cost of operation.

Since there are no rails to complete the electric cir-



LAYOUT OF ROUTE ON WHICH TROLLIBUS OPERATES cuit, two overhead wires are used to form an all-metallic circuit. The wires are strung parallel, 14 in. apart, and doubly insulated with porcelain ring insulators. The two wires are held in position by a spreader. The proper installation of the necessary overhead calls for a new complete line of fittings with the exception of the trolley ears and studs. Several accompanying views, some of which were taken while the bus was on the experimental track in Schenectady, show the hangers used on tangent stretches as well as the pull-offs necessary on curve construction.

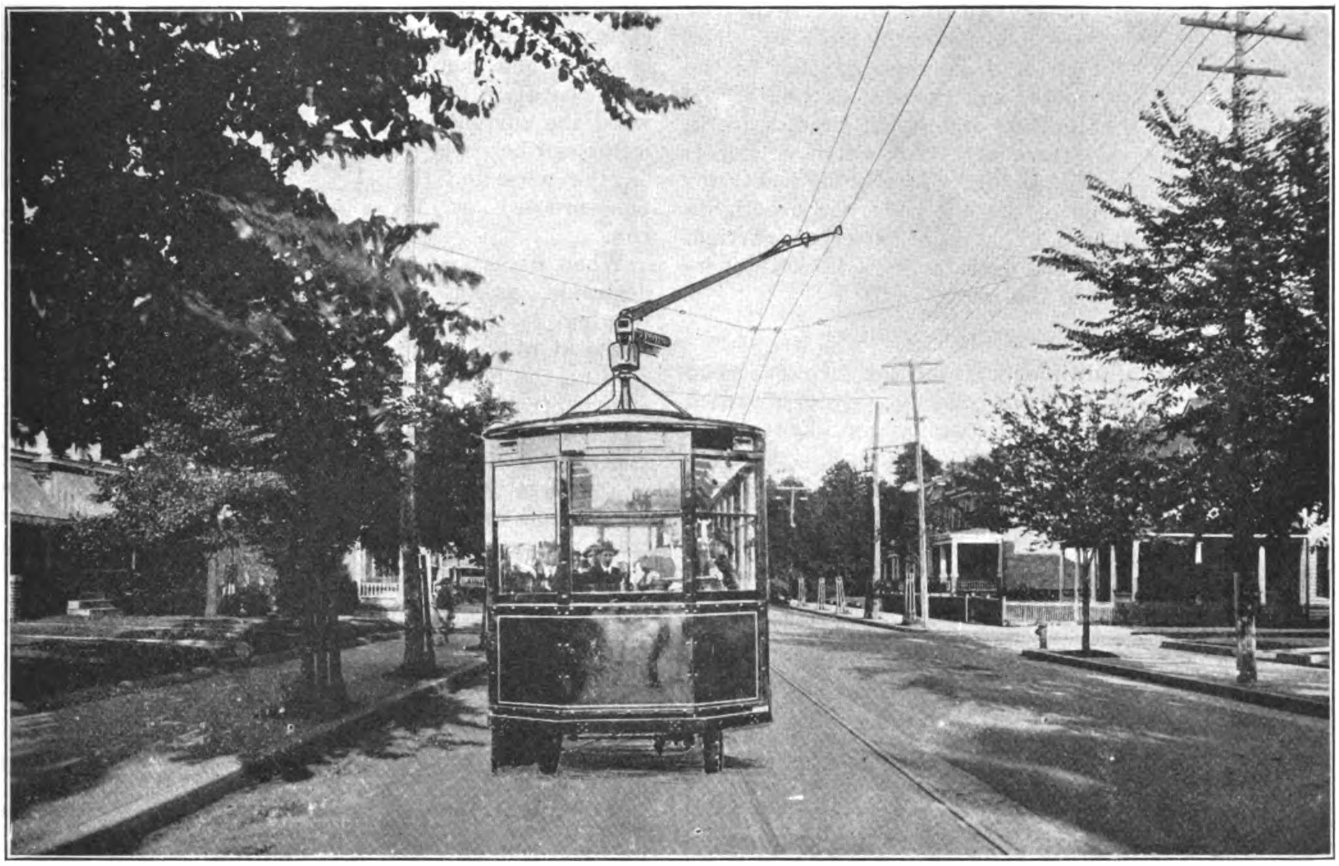
GENERAL DESCRIPTION OF THE CHASSIS AND BODY

The chassis, which has an over-all length of 22 ft. 9 in., can be rated as of 5 tons capacity. The frame is constructed of steel channels, which weigh approximately 13 lb. per ft. and are reinforced with gussets at the corners and at all intersections with cross members. The distance between the side members is 34 in., which provides ample room for hanging the motor in between. To the frame is also directly attached the body, which is constructed of steel uprights on 26½-in. centers and rolled steel car lines that give an arched roof effect very much similar to that of a limousine body. The body is paneled below the window sills with ¼ in. Steelasote and the roof material is Three Star Agasote.

With the body so mounted a semi-flexibility is obtained that is not found in general street car practice, where bodies are built rigidly with side sills and mounted on rigid trucks. The semi-rigid body and frame are supported on half-elliptical springs mounted directly on top of the axles, using the standard Atlas truck method of suspension. The front springs are 50 in. long and 3 in. wide with twelve leaves, while the rear springs are 56 in. in length and have sixteen leaves.

The front axle is an I-beam section and carries 50 per cent of the weight of the bus. The rear end is a standard 5-ton Sheldon worm-gear drive which is connected directly by universal joints to the propeller shaft.

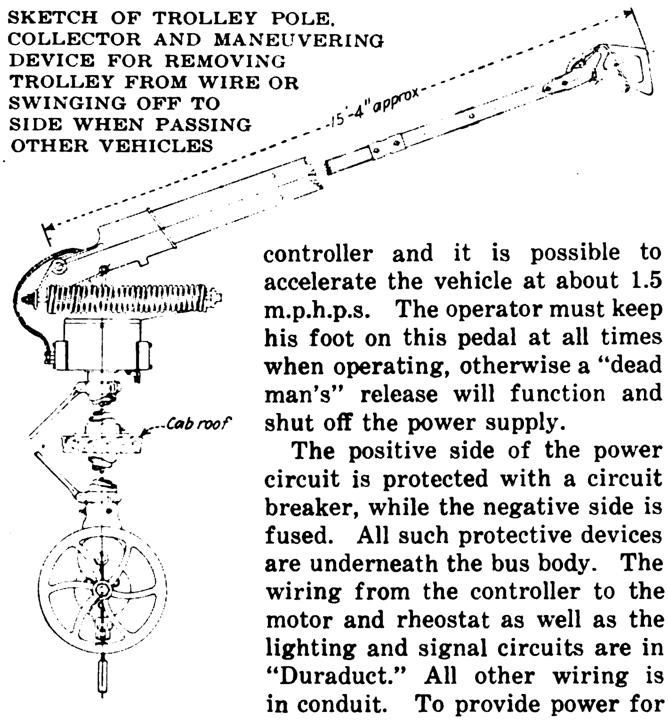
Cushion wheels of the Mead type, built by the American Cushion Wheel Company, are used exclusively. On these wheels are mounted 36 in. x 6 in. Kelly-Springfield solid rubber tires of the caterpillar type. Much has yet to be learned as to the type of tire best suited for trackless trolley operation, and by no means can it be said that any one type is to be used until experiments of sufficient duration have been made in actual service to prove durability and minimum cost per mile. The track tread of the tires as mounted on the wheels is 58 in. measured center to center. This is 2 in. wider than the standard track gage.



THE EXPERIMENTAL ROUTE IS ALONG FLOYD AVENUE THROUGH THE RESIDENTIAL DISTRICT—THE BUS, WITH ITS LOCAL ENVIRONMENTS, WILL SOON BE A FAMILIAR PICTURE

Power for propulsion is furnished by a standard GE-258 ball-bearing ventilated railway motor, a type that has been largely used for driving safety cars. This motor is so supported between the side frames that it can be direct connected to the propeller shaft by a universal, in about the same manner as an automobile gear drive shaft is connected.

The operator or driver operates the controller by means of a foot-operated RZ type of controller, a detail view of which is presented. By pressing down on the pedal lever, which is mounted in all respects similar to the automobile clutch foot pedal, the driver can actuate the controller point by point by alternately pressing on and releasing pressure on the foot pedal. As the pressure is released, the pedal moves upward and a "dog" catches in the next notch. There are five points on the



SKETCH OF TROLLEY POLE, COLLECTOR AND MANEUVERING DEVICE FOR REMOVING TROLLEY FROM WIRE OR SWINGING OFF TO SIDE WHEN PASSING OTHER VEHICLES

controller and it is possible to accelerate the vehicle at about 1.5 m.p.h.p.s. The operator must keep his foot on this pedal at all times when operating, otherwise a "dead man's" release will function and shut off the power supply.

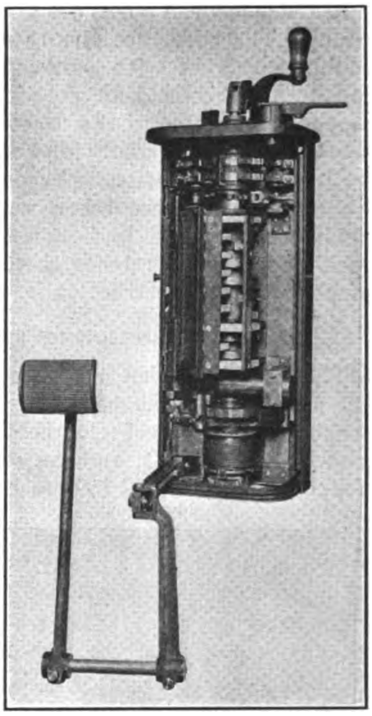
The positive side of the power circuit is protected with a circuit breaker, while the negative side is fused. All such protective devices are underneath the bus body. The wiring from the controller to the motor and rheostat as well as the lighting and signal circuits are in "Duraduct." All other wiring is in conduit. To provide power for the emergency lighting of the bus body, the headlights and tail-light a 120-amp.-hr. storage battery is carried. This is charged as the bus operates by a 12-volt generator direct connected to the motor shaft.

CURRENT-COLLECTING DEVICE

Power is taken ordinarily from the two overhead wires by a specially designed collector, details of which are shown in one of the accompanying illustrations. This collector, which weighs but 16 lb. exclusive of the base, has two sliding shoes with approximately 12 in. free space for each wire and makes the over-all width of the collector shoe 28 in.

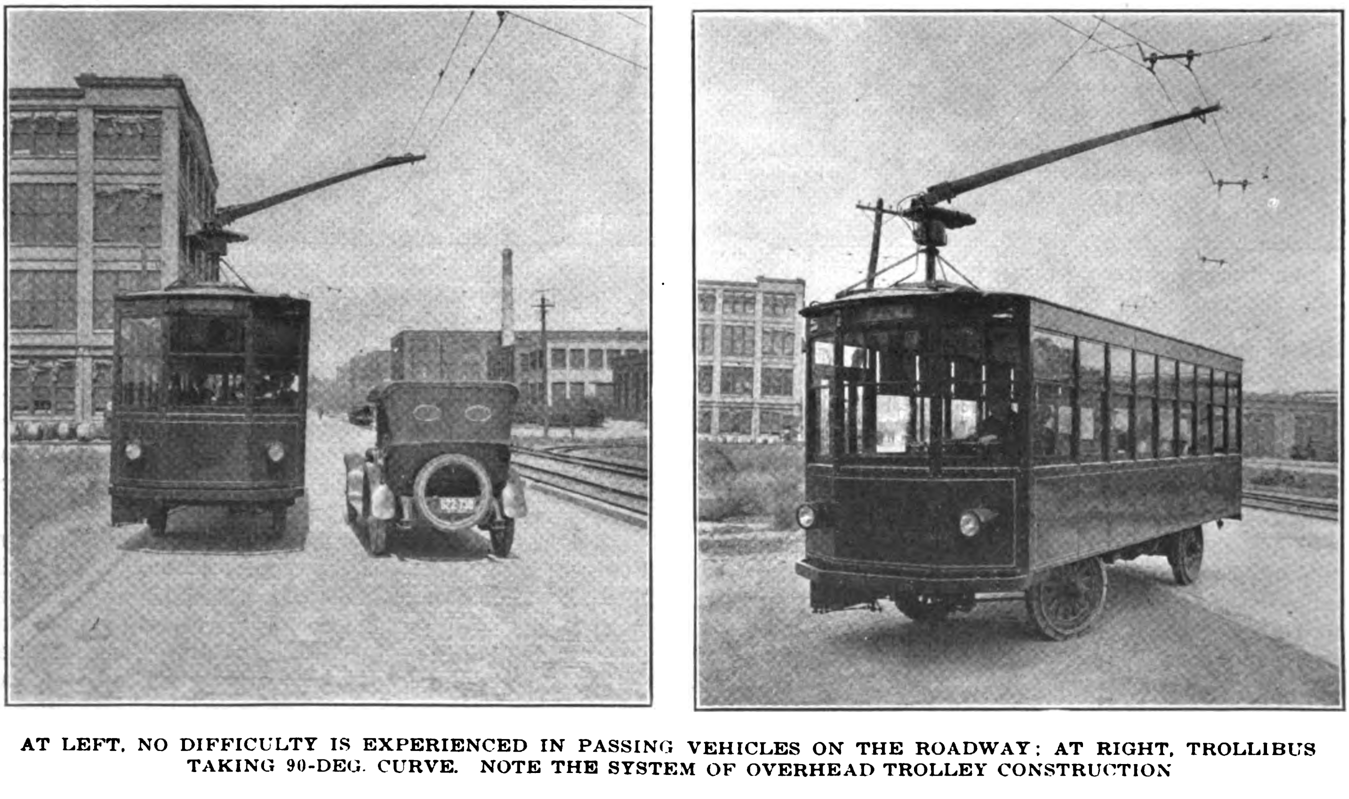
By the use of this form of collector, which has a spring tension of 25 lb., it is possible for the driver to get off center about 9 ft. before the collector will pull off the wires and leave the bus "dead."

The operator can maneuver this collecting mechanism from inside the trolley bus. A vertical wheel which actuates a lever operates against the tension spring and makes it possible when one bus vehicle passes another, utilizing the same trolley wires, to clear the line and allow the one met to proceed. Afterward the current collector can be replaced on the wire and the bus proceed on its run.



INTERIOR VIEW OF CONTROLLER, SHOWING HOW FOOT PEDAL FUNCTIONS WITH RATCHET AT BOTTOM OF CYLINDER SHAFT

When necessary or desirable, as on returning to the carhouse at night or for repairs, the bus can be made to operate on a standard 600-volt trolley circuit. A short-circuiting sliding contact trolley shoe is inserted in the collector, which provides the positive side of the circuit. To get a ground or complete the circuit a metal shoe is fastened to the body frame and dragged along the top of the grounded track rail. By this means it has been found possible to operate the bus at a speed of 8 or 9 m.p.h.



AT LEFT, NO DIFFICULTY IS EXPERIENCED IN PASSING VEHICLES ON THE ROADWAY; AT RIGHT, TROLLIBUS TAKING 90-DEG. CURVE. NOTE THE SYSTEM OF OVERHEAD TROLLEY CONSTRUCTION

The interior finish of the bus, as well as the entrance and location of the apparatus for operation and fare collection, is shown in one of the accompanying illustrations. The seating capacity is thirty and with fifteen standees the maximum safe loading is considered forty-five. On the basis of the seating capacity this allows 5¾ sq.ft. per seat. At 150 lb. each for the passengers and also including the driver, the live load is 6,900 lb. The over-all length of the vehicle is 24 ft. 8 in., which corresponds to a linear length of 0.822 ft. per passenger seat, as compared to 0.935 ft. with the Birney standard 28-ft. safety car. There are three cross seats and one short longitudinal seat for three passengers on each side of the bus. In the rear is a semi-circular seat large enough to accommodate twelve passengers. The seats are bolted to the body floor and are upholstered in leather and are spaced on centers of 28 in. with an 18-in. aisle. Ventilation is provided by running an air duct on each side above the top of the window sash next to the roof the entire length of the car with an air intake at the front. This duct is perforated with small holes around each of the lamp sockets used to light the body to form an ornamental design. No card advertising racks are carried.

There are two illuminating systems, one on the trolley circuit and the other on the storage battery circuit. The trolley circuits consist of two five-light, 23-watt frosted globes mounted directly over the tops of the windows. The other is an emergency circuit and utilizes current from the 8-volt storage battery. Only three lamps are on the latter circuit, one over the entrance, one over operator's head, the third over rear door.

The entrance and exit are at the front on the right, with doors manually controlled by the operator. The two-leaf folding doors can be opened inwardly so as to give a clear opening of 34 in. At the rear of the bus body is an emergency door.

The steps are entirely within the body, so that with the doors closed there is no opportunity for any one to ride on the outside of the vehicle. The height of the first step from the ground will be from 13 to 15 in., depending on the street level and the number of passengers on the bus. There are two 9-in. risers and a 2½-in. ramp to the level floor, which is about 35 in. from the ground with the bus loaded.

The curtain fixtures are those of the National Lock Washer Company, while the curtain material is pantasote. A Faraday buzzer signal system to the operator is provided for the convenience of the passengers. Two Golden Glow headlights with 21-c.p. lamps are mounted on the front dash and operate from the storage battery.

The side windows can be pushed up 16½ in. so that a passenger has a clear vision. Other accessories include roller destination signs, mirror for operator to maneuver the trolley, Johnson farebox, light switches, etc.

The interior of the car is painted with white enamel above the tops of the windows. The outside is olive green with a gold stripe.

The second Simplon tunnel in Switzerland is reported to be nearing completion. Less than a half mile is still to be completed and about one and a quarter miles of rails to be laid. The electric cable transmission line on the north side has been completed and that on the south side is under construction. It is expected that the tunnel will be ready for traffic in December of this year, by which time the Italian section will also be ready for service.

York's Trolley Bus Service

TROLLEY bus service, according to the *Tramway & Railway World*, was recently established in York, England, over a 1.25-mile route with four vehicles comprising the equipment.

Some of the points that led up to the installation of these buses was that the experience of various authorities with gasoline motor omnibuses upset the optimistic expectations of those who overlooked the disadvantages of the internal combustion engine. It was found that repairs were numerous and costly, that frequent overhauls reduced the annual mileage, so that the useful life of a motor bus was somewhere near five years. Then, finally, just when revenue was being swallowed up by expenses, the price of gasoline increased until the cost of fuel alone reached the abnormal figure of 8 pence (16 cents at normal exchange) per car-mile, and many services that had been launched with the hope of profits were actually operated at a loss.

There are no severe grades on this route in York, but the service is conducted over some of the very narrowest streets in the city, having numerous sharp bends and turns. As a result, the vehicles have the narrow over-all width of 6 ft. 3 in.

As the buses cater to very light traffic, they have been designed on the "one-man" principle, using fare boxes. The driver's vestibule is inclosed and has an entry on the off-side. The cars are of the single-deck type and have a seating capacity of twenty-four.

Motive equipment consists of two 23-B.hp. motors arranged for series-parallel control and two cam-control trolleys. Cars can deviate 17 ft. off center without risk of dewiring.

Another Advantage of Electrification Emphasized

THAT smoke was not only a nuisance but was an actual source of danger was brought out in a paper on the safely hazards of the New York Central Terminal equipment by H. M. Balliet, assistant terminal manager, Grand Central Station, read before the American Society of Safety Engineers on May 27. He showed by means of pictures how dense the smoke in the old Park Avenue tunnel used to be, with the large number of steam locomotives in operation for both through trains and for switching. On certain days, when the air was still and heavy, the tunnel, filled with smoke that refused to dissipate, would be made nearly impassable. At these times the tedious and dangerous practice had to be resorted to of passing an incoming or outgoing train along from flagman to flagman, usually twenty or thirty being required to furnish any degree of safety. The hazard involved in this sort of train operation was great, especially for the yard men and those engaged in the signaling. Train operators who have worked under the new conditions, Mr. Balliet said, realize how many of the former ubiquitous hazards have been corrected by electrification.

In remarking on the hazards of various parts of the electrical installation, Mr. Balliet mentioned how successful from the safety standpoint the type of third-rail construction employed had been. The New York Central third rail is of the under-running type and the cross-section is symmetrical with respect to both horizontal and vertical axes. Because of the wooden sheathing, it is very seldom indeed that any one comes into contact with the rail.

Merchandising Transportation

This Is the Second of a Series by the Author on This Subject—The Topic Particularly Considered in This Issue Is the Education of Trainmen Along Salesmanship Lines and the Illustrations Are from Advertisements Published by the Company or from Bulletins or Letters Sent to Its Men

By W. H. BOYCE
General Manager Beaver Valley Traction Company, New Brighton Pa.

SOME writer, in defining salesmanship, says: "It is simply making the other fellow feel as you do about what you have to sell." So your job, Mr. Manager, is cut out for you. You must sell the idea of salesmanship to your employees so that they may sell the actual service to your public.

Some trainmen on entering the service do not seem to have been taught the rudiments of courtesy, so you must first teach them to show the proper respect to your passengers, the source of your and their income.

If your employees are courteous and polite, the impression is good. If too short with answers, or other than attentive, the opposite is true. You cannot afford to keep in the service men who would cause the opposite to be true. Indifference to the public on the part of your employees is a very serious blight on your business.

Every employee should be encouraged to acquire a personal reputation for good manners as well as good deportment. They are your personal representatives.

Any conductor who is oversensitive will never be a good salesman. He must be able to take a rebuff without taking offense or without losing his temper.

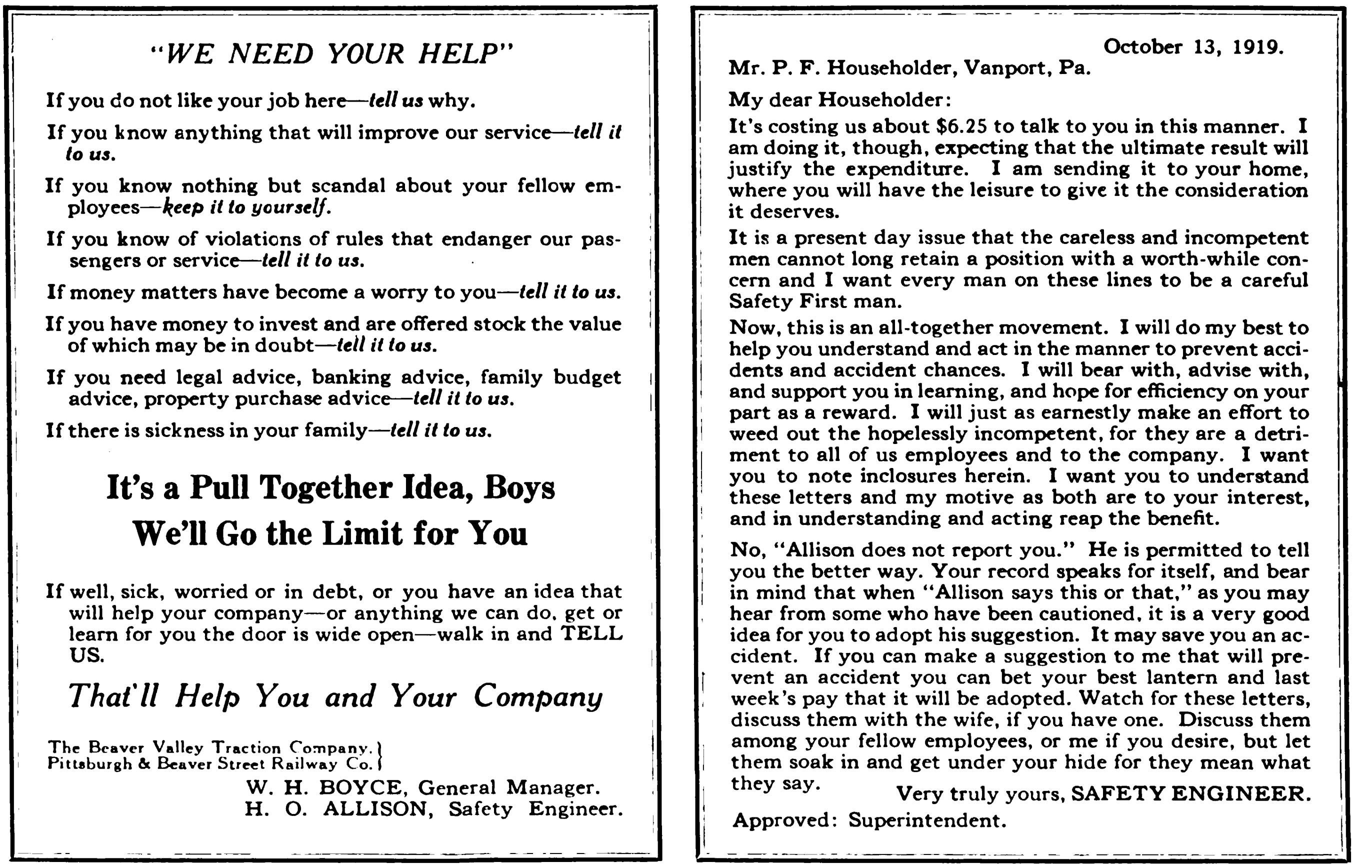
Interested, careful, safety first, attentive, cleanly, obliging and courteous trainmen will make for more car riders and thus assist you in selling more car rides.

Street railway employees come in closer contact with the public than the employees of other utility companies. Any person accepting employment must obligate himself to do all in his power to prevent disputes. He must be required to be courteous under irritating circumstances and polite under criticism of persons unfit mentally to criticise the service either intelligently or constructively.

On the Beaver Valley Traction lines we have kept before us the idea that the first principle that should contribute to the success of the sales organization is honesty—honesty in dealing with the members of the organization and instilling in them a sense of duty and honesty both to employer and the public.

We have spent considerable time and effort in teaching our employees what we consider proper transportation selling methods and to this end have issued an employees' service code, supplemented by frequent personal interviews and personal letters, and circular or individual letters mailed to employees' homes.

Salesmanship is something more than a science and an art. It is a principle—a principle of human relationship. It is the principle of the influence of one person or persons on another person or persons. To sell we must make the other fellow feel as we do about what we have to sell.



"WE NEED YOUR HELP"

If you do not like your job here—*tell us* why.

If you know anything that will improve our service—*tell it to us.*

If you know nothing but scandal about your fellow employees—*keep it to yourself.*

If you know of violations of rules that endanger our passengers or service—*tell it to us.*

If money matters have become a worry to you—*tell it to us.*

If you have money to invest and are offered stock the value of which may be in doubt—*tell it to us.*

If you need legal advice, banking advice, family budget advice, property purchase advice—*tell it to us.*

If there is sickness in your family—*tell it to us.*

**It's a Pull Together Idea, Boys
We'll Go the Limit for You**

If well, sick, worried or in debt, or you have an idea that will help your company—or anything we can do, get or learn for you the door is wide open—walk in and TELL US.

That'll Help You and Your Company

The Beaver Valley Traction Company.
Pittsburgh & Beaver Street Railway Co.
W. H. BOYCE, General Manager.
H. O. ALLISON, Safety Engineer.

October 13, 1919.

Mr. P. F. Householder, Vanport, Pa.

My dear Householder:

It's costing us about $6.25 to talk to you in this manner. I am doing it, though, expecting that the ultimate result will justify the expenditure. I am sending it to your home, where you will have the leisure to give it the consideration it deserves.

It is a present day issue that the careless and incompetent men cannot long retain a position with a worth-while concern and I want every man on these lines to be a careful Safety First man.

Now, this is an all-together movement. I will do my best to help you understand and act in the manner to prevent accidents and accident chances. I will bear with, advise with, and support you in learning, and hope for efficiency on your part as a reward. I will just as earnestly make an effort to weed out the hopelessly incompetent, for they are a detriment to all of us employees and to the company. I want you to note inclosures herein. I want you to understand these letters and my motive as both are to your interest, and in understanding and acting reap the benefit.

No, "Allison does not report you." He is permitted to tell you the better way. Your record speaks for itself, and bear in mind that when "Allison says this or that," as you may hear from some who have been cautioned, it is a very good idea for you to adopt his suggestion. It may save you an accident. If you can make a suggestion to me that will prevent an accident you can bet your best lantern and last week's pay that it will be adopted. Watch for these letters, discuss them with the wife, if you have one. Discuss them among your fellow employees, or me if you desire, but let them soak in and get under your hide for they mean what they say.

Very truly yours, SAFETY ENGINEER.

Approved: Superintendent.

Typical Bulletin and Letter Issued by Company to Employees

Our ideas of how to sell the service idea to employees is best illustrated by the accompanying examples of talks to the men and the public.

The things kept in mind have been:

1. To make our employees realize the different kinds of competition that we face.
2. To have them make the passengers' ride as pleasant as possible.
3. To have each employee acquire a reputation for good manners.
4. To aid the employee to enjoy his work.
5. To teach each employee to control his temper.
6. To help him to obliterate his self-consciousness and devote all his energies to his duties.
7. To obtain his co-operation.
8. To help him constantly to improve himself.
9. To have him be civil, kindly and thoughtful in his actions, considerate of the welfare and wishes of others; in other words, to be courteous.

In order to live you must sell car rides. Your auditing or stores department may be weeks behind. Your purchasing department may secure inferior materials. Your finances may have been mishandled. And yet for a time you would be able to run cars and sell rides. But to shut off all car riders, all revenue, how long will you be able to operate?

Think it over.

Be a motor car, not a trailer.

Typical Advertisements in Daily Papers

Many Thanks

WE have received letters praising trainmen for courtesy and consideration of passengers' comfort, convenience and welfare. Many cases of kindness to children and elderly people have been mentioned.

Such letters help the public, the employees and the company.

We invite the public to write us about any feature of the work of our trainmen or of our service which they consider worthy of mention. We will see that every such letter is placed before the employee to whom the credit is due and that it is entered upon his record in the company's offices.

We invite you also to report any lack of courtesy or inefficiency. We investigate every complaint promptly and carefully, and take such action as the facts warrant.

Beaver Valley Traction Co.

All Cars Have Controllers.

All tempers should have. If either are missing from our cars or employees won't you give us the benefit of your knowledge? We in turn promise to improve the condition.

Beaver Valley Traction Co.

Your Point of View

OUR car riders here can be assured that this organization will consider each ride sold as much from the rider's viewpoint as from our own.

The cordial relations existing between this company and its thousands of patrons have been strengthened by always trying to put ourselves in the car rider's place.

Do not hesitate to write or phone us upon service matters. We are in your employ.

Beaver Valley Traction Company

Street Car Conductors—Service and You:—

HUMAN, real, a living, breathing representation of the handiwork of God—that is the Street Car Conductor. He has his temperament, emotions, temptations, likes and dislikes, affections, loved ones, hopes, aspirations, trials and tribulations just the same as you and I.

We take the best of those applying for this position and through teaching and constant supervision strive to make of them such men as will truly represent these companies before you—the public, our patrons.

Just as all humanity is liable to err, misjudge, fail or weaken, this man of service on the cars is not immune. He cannot be and be human. We pride ourselves though that the street car conductor errs less often under a ten times greater strain than those in other similar callings.

Bear in mind the street car conductor daily has a constantly changing patronage. It becomes a finished salesman's task to meet the moods, supply the information, sell the ride, make the collection and satisfactorily close the transaction by delivering each patron safely to destination on time and without undue inconvenience.

We spend much time training the men serving you on the lines. To always keep employed and to employ those who are or will become most proficient is a task. That perfect type of supervision does not, nor will it ever, exist in this or any other calling.

We ask you to expect a better service, more thoughtful attention on these lines than you will obtain in any other community, but, please, when one employee fails to meet your standard or expectation of service, do not condemn us all. Recognize the frailties of man and be governed accordingly.

Beaver Valley Traction Co.
Pittsburgh & Beaver Street Railway Co.

Extracts from Employees' Service Code

INCREASING BUSINESS

Increasing business on the street cars may sound funny to you but it can be done.

Every time you run past an intended passenger you create a feeling that results in his walking.

Every time you are late people walk.

Every time you miss being at the depot stop when the train comes in people walk.

Every fare counts against you, as the fares pay your wages, and I get mine from the same source.

PASSENGER PAYS YOU

The greatest *service* existing in your work is the *service* the passenger gives you. Funny, isn't it? True enough. I said he paid your wages. That's mighty important to you—mine are to me anyway. So, every *service* you can give the passenger will not be any more than he is entitled to—remember that.

But few of the passengers consider you except in the way you serve them in their transportation needs. Do your duty by every one and when the day comes to a close you can in content spend the evening with the folks at home. Violate the rules and circulate your grouch and things won't be pleasant here nor at home.

SOME WALK—SOME RIDE

There is no "have to" about it any more. Those who can, walk when you are not there. Many others buy Fords or automobiles, and if luck is with them "get there" without using the street cars at all.

So you see that we have Competition.

Good business demands that we meet that Competition with something better. There's where your job begins.

HOW YOU MEASURE UP

Let me tell you that the passengers are more valuable to us than you are. We cannot get along without the passengers.

So, put in the background or shelve any idea you may have or had that you are the king pin. You are not—neither am I—the passenger is the important party.

Don't forget it.

THE PASSENGER

What if some of them are cranky and want to "bawl you out" for a mistake of yours that you did not intend to make but did it and it brought forth the passenger's rebuke? Wait until he is through and then in a quiet and gentle tone of voice say "I am sorry, sir, I did not intentionally make the mistake." That is all you need to say. Say it like a gentleman or like the gentleman you are and let the passenger think it over. Not another word from you. This method will win occurrences that if handled differently result in wordy battles; make you feel miserable the rest of the day, hate your job; and make the passenger condemn our service to his friends.

STYLES AND TYPES

All kinds and types of people patronize your car. Complete *service* demands that you please all of them. This includes the man who has just come from a quarrel with his wife and who would like nothing better than to take his revenge out on you. Or, it may be the lady passenger who has just missed a bargain sale because the car she came on was not on time. It may be a bumped corn, dyspepsia, indigestion, stomach ache, or just natural cussedness or disagreeableness. It does not make any difference to you what the cause is. A street car is a public place, and it may be best to let the passenger decide on the attention he or she wishes to attract by language or act. As for you—well, if *our* trainmen could not intelligently meet every such situation we should feel that something was seriously wrong. Keep *Service* in mind. Never sacrifice that to anger or act of yours.

DISCIPLINE

Sometimes it becomes necessary to use harsh measures to enforce full observance of the rules. The trainman who wilfully violates rules will find it a hard matter to hold a position here. Suspension as discipline does not always signify that the lay-off is the end of the matter. It is not the desire of these companies to discharge competent men but the safety of our passengers and complete service to them justifies a careful weeding out of the careless and incompetent.

DON'T SAY DON'T

Never say "Don't" to a passenger of yours. Children are made incorrigible through constant "don'ts" of loving but unthoughtful parents.

Don't is argumentative and tends to arouse a desire to do just what is forbid. Never say to a lady, "Don't get off the car backward." For right away she will think I'll get off the car that way if I want to and it is none of your business. You will get better results if you say *"Please get off the car facing the front."* Too, "move forward" does not mean anything to the people standing in the aisle right at the entrance door. They are on the car and don't realize there is anyone else to get on. It is better to say, *"Please step forward in the car so that others may get aboard."*

Ways in Which Morale Is Increased on the Beaver Valley Lines

Akron's Buses Were Powerful Influences in Developing Housing Sites

No. 1—Present-day standard White truck mounting Avery body.

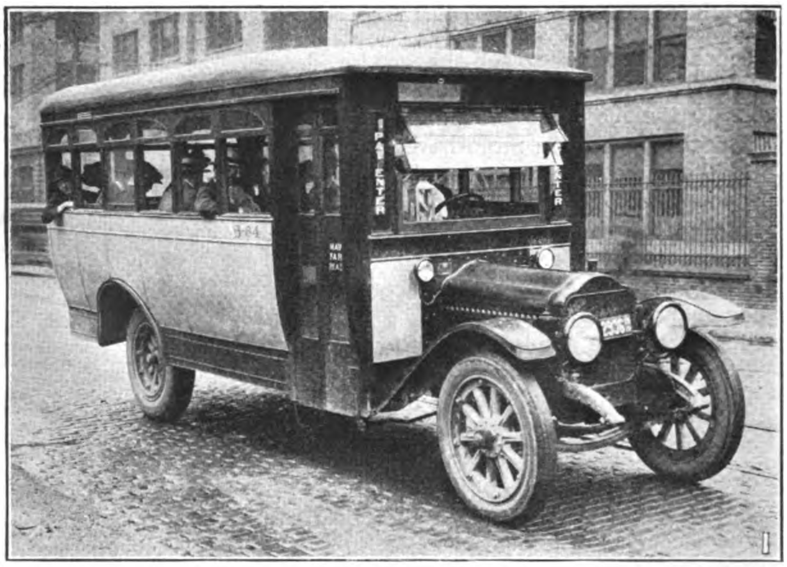
No. 2—Type of original bus put in service in September, 1915.

No. 3—Entrance to Avery type body showing fare box and location.

No. 4—Experimental six-wheel type vehicle, with 70-hp., 6-cylinder, $4\frac{3}{4} \times 5\frac{1}{2}$ Wisconsin motor. This vehicle seats forty-four passengers.

No. 5—Interior of Avery body fitted with cross seats.

No. 6—First type of single-deck bus with open body.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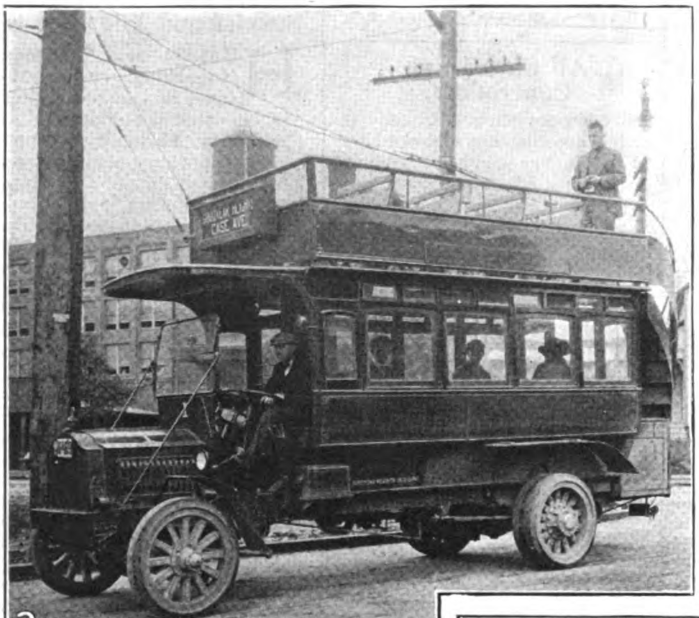
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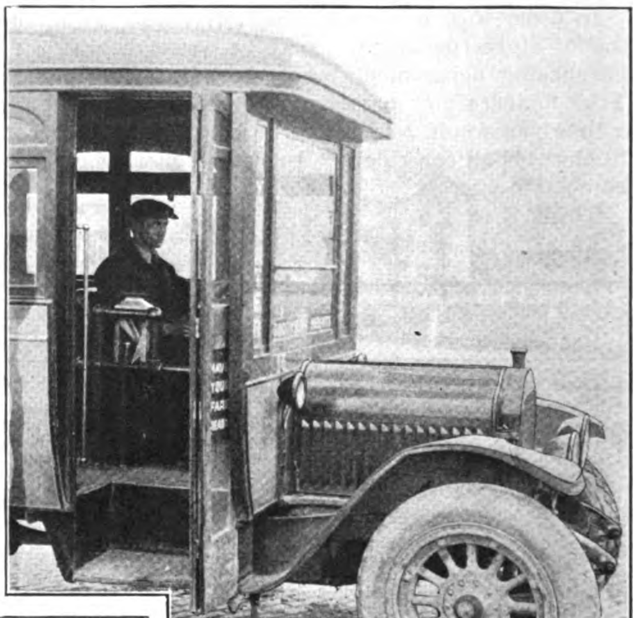
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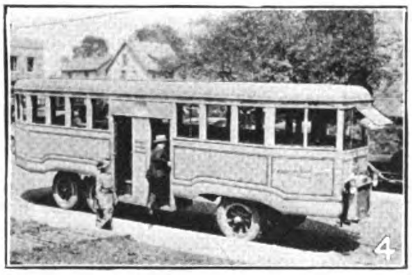
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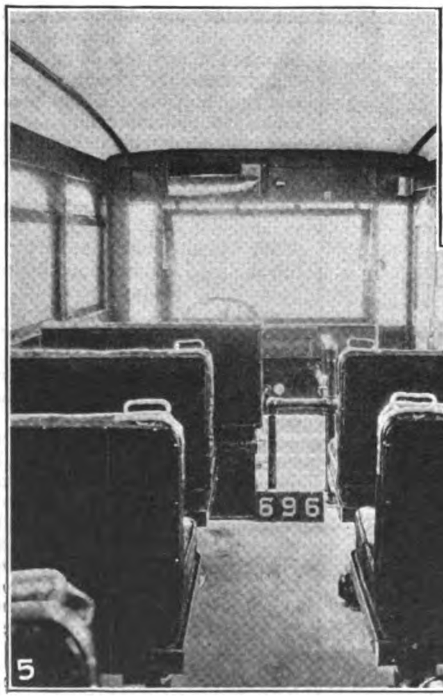

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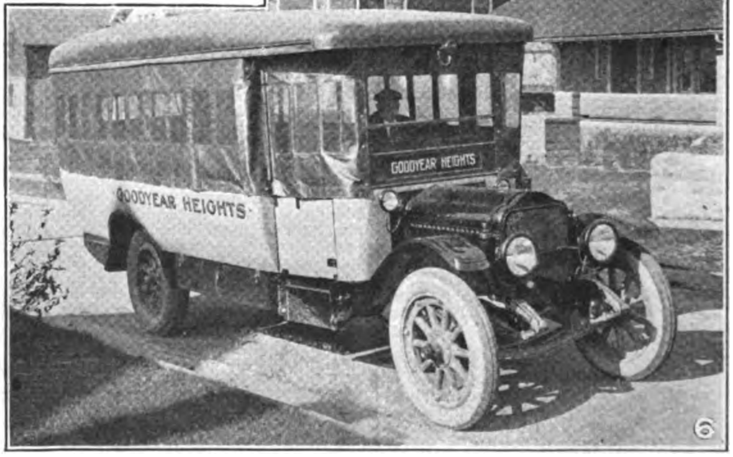

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Akron's Motor Bus Route

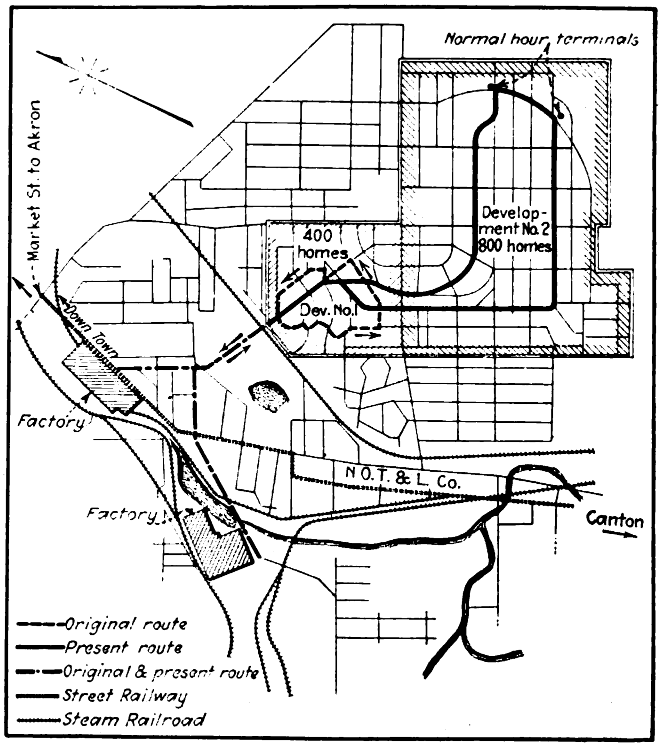
A Non-Competitive Route, Operated in Connection with a Housing Development, Proves that the Motor Bus Can Be Operated Successfully as an Auxiliary When Proper Service Is Given and Reasonable Fares Are Charged —Full Statistics Are Given

THERE is in Akron, Ohio, a bus transportation system that has been in operation several years. This bus line, although operated independently, is an auxiliary to the local street railway system and serves territory not reached by any other transportation service. The line, which in no sense is a competitor of the trolley system, was started by the Goodyear Tire & Rubber Company and is still owned by that corporation, and its purpose is to provide transportation for employees of the Goodyear company between the factory and a tract 2½ miles from the business center of Akron. This property, called Goodyear Heights, had been developed as a residential district in 1913 by the company because of the increasing difficulty which its employees found in obtaining attractive housing facilities in Akron. The first motor bus service was established in September, 1915, because of the need for transportation facilities. It has been the company's policy to make the bus line self-supporting and have sufficient net income after paying operating expenses to meet fixed charges and taxes, including the usual rate of interest on the investment required.

RATES OF FARE

The 3-cent cash fare established when the line was first opened in September, 1915, rémained in effect up to December, 1917, when it was changed to 5 cents cash or eight tickets for a quarter. This ticket rate remained in effect until Sept. 1, 1919, when the ticket rate was increased to six tickets for 25 cents, or twenty-eight tickets for a dollar. On Feb. 1, 1920, the sale of twenty-eight tickets for a dollar was discontinued, and on Oct. 1, 1920, the ticket rate of six for a quarter was also discontinued. Since that time the fares have been 5 cents cash without any reduced-rate tickets.

When the bus route opened in September, 1915, the equipment consisted of but one 3-ton capacity truck, on which was mounted a double-deck body, seating thirty-five people, seventeen on the upper deck and eighteen on the lower deck. The upper deck had cross seats while the lower deck had longitudinal seats. The truck was equipped with solid tires throughout, the rear wheels having double treads. An engine capable of handling 5-ton loads was used, due to the severe grades on the route.



ROUTE OF MOTOR BUS AND CONNECTION WITH LOCAL TRACTION COMPANY AT EAST MARKET STREET

TABLE I—OPERATING STATISTICS GOODYEAR HEIGHTS MOTOR BUS LINE

Dec. 1, 1917, to Dec. 31, 1920

	13 Months Dec. 1, 1917, to Dec. 31, 1918	Calendar Year, 1919	Calendar Year, 1920
Buses in operation at start of period	1	2	8
Buses in operation at the close of period	2	8	12
Average number operated per month	1.1	4.8	11.6
Total miles of bus travel	58,451	198,113	332,787
Total miles of bus travel on routes	57,938	194,151	326,622
Slack travel, to and from garage	513	3,962	6,165
Number of one-way trips	44,567	111,581	187,714
Average one-way trip distance (miles)	1.3	1.74	1.74
Time of one-way trips (minutes)	10.0	11.6	11.6
Number of bus-hours of service	7,428	21,572	36,291
Number of bus-hours available	8,113	33,060	79,344
Per cent of time buses in service	91.5	65.0	46.0
Bus-miles per hour of actual bus service	7.8	9.0	9.0
Total passengers carried	520,879	1,745,189	2,490,856
Number of passengers carried per month	40,068	145,432	207,571
Number of passengers carried per day	1,315	4,848	6,919
Number of passengers carried per bus-hour	69.0	80.9	68.6
Number of passengers carried per trip	11.90	15.60	13.30
Per cent passenger loading (21 seats)	55.7	74.3	3.3
Per cent maximum loading (35 passengers)	34.0	45.0	38.0
Number of passengers carried per bus-mile	8.91	8.80	7.48
Miles operated per gallon of gasoline	5.8	5.3	5.3
Miles operated per gallon of oil	56.7	69.2	102.2

In the spring of 1916 the double-deck bus was supplanted by one of the single-deck type, equipped with pneumatic tires. Among the advantages gained from the use of pneumatic tires was much better riding qualities.

The equipment since made standard consists of a 2-ton chassis equipped with a 5-ton motor, on which is mounted an inclosed body of the Avery type with longitudinal seats, and pneumatic tires 40 in. x 8 in. in the rear and 37 in. x 5 in. in the front.

It was found that the 2-ton chassis was adequate to carry the load and would stand the strain, but that a 5-ton motor was necessary due to the heavy grades over which the bus had to operate. This large size motor also has an advantage in obtaining more rapid acceleration after each stop and the buses are capable of making a speed of 30 to 35 m.p.h. where traffic conditions permit. Typical views of the present types of buses are shown in the accompanying illustrations. On Jan. 1 they comprised twelve of various types. There were three of the type B-64 with cross seats and three with longitudinal seats, and four of the type with the side and cross seats. Another type, of which there is but one as yet, is the latest development in passenger carrying buses. It is a six-wheeled chassis, seating forty-four passengers. All wheels are equipped with 40 x 8 pneumatic tires, the four rear wheels being driving, thus increasing traction. The two rear wheels pivot about a trunnion, and thus in going over rough section of road the chassis deflects only one-half as much as a four-wheeled truck. This fact, combined with the use of pneumatic tires, makes the six-wheeled bus an exceptionally easy riding vehicle. This bus was first put into operation in October, 1920, and has been found to be thoroughly practical.

SCHEDULES AND HEADWAY

When the bus route was first opened up the schedule provided a continuous circuit as shown on the map from East Market Street around Development 1. Such routing had its advantages when the traffic was comparatively light, but as the traffic increased this method of routing became less and less desirable because of delays due to interchange of traffic along the road. Numerous schemes of routing were tried in order to determine the best method. When the bus routes were extended to take in Development 2, two distinct routes were operated during the rush hours and buses returned over the same routes. During the normal hours of the day when the traffic was light the buses make a circuit as shown in the map through the second development. The same headway is maintained as during the rush hours, but with only half the number of buses in operation. This feature brings out distinctly the economies that can be directly attributed to the flexibility of a motor bus line.

SCHEDULES MAINTAINED

Date		Headway in Minutes During	
From	To	Normal Hours	Rush Hours
September, 1915	November, 1918	20	20
November, 1918	January, 1919	20	10
January, 1919	June, 1919	15	8
June, 1919	August, 1919	10	5
August, 1919	January, 1920	10	4
January, 1920	June, 1920	10-12	3
June, 1920	December, 1920	10-12	3½

ANALYSIS OF OPERATION

Table I shows operating statistics for the period December, 1917, to December, 1920, inclusive. These figures are actual and show all important data relative to operation. It will be noted that the percentage of available time that the bus equipment operated in 1918 was 91.5 per cent as compared with 65 per cent in 1919 and but 46 per cent in 1920. This figure is specific in that the net earnings of the property are almost directly proportional to this load factor. It shows that care should be exercised in making additions to equipment, where added use of existing equipment might be made to serve the requirements.

Table II shows financial operations for the same period. Tire costs have been included at customers' list prices on the following mileage basis: In 1918—9,000 miles; in 1919—10,000 miles; in 1920—11,000 miles.

It will be noted that the revenue as shown is a straight 5-cent cash fare, even though the actual fare collection was somewhat less, and in accordance with the rate schedule shown in the previous paragraph. As this bus line was not operated for profit it is believed that the revenue as shown from a 5-cent cash fare will be of more interest than the actual revenue received.

The study of Table II shows that the lowering of the load factor on the bus decreases the bus mileage per bus and increases the cost per mile of operator's labor. The amount of depreciation is based on a bus life of 100.000 miles, which mileage is covered in three and one-half to four years. The buses at the end of this period of time are carried at a minimum service value of $1,000, the depreciation being adjusted according to the selling price when the bus is sold.

TABLE II—INVESTMENT, OPERATING EXPENSE AND REVENUE GOODYEAR HEIGHTS MOTOR BUS LINE

	Actual			Per Bus Mile			Percentages of Total Operating and Fixed Charges		
Investment:	Thirteen Months Ended Dec. 31, 1918	Year Ended Dec. 31, 1919	Year Ended Dec. 31, 1920	Thirteen Months Ended Dec. 31, 1918 Cents	Year Ended Dec. 31, 1919 Cents	Year Ended Dec. 31, 1920 Cents	Thirteen Months Ended Dec. 31, 1918	Year Ended Dec. 31, 1919	Year Ended Dec. 31, 1920
At beginning of period	$6,075	$8,336	$29,370	......	......	......	......	......	......
Added during year	6,425	30,770	47,568	......	......	......	......	......	......
Total at end of year	$12,500	$39,106	$76,938	......	......	......	......	......	......
Buses sold during year	....	....	8,572	......	......	......	......	......	......
Depreciation charged to operation	4,164	9,736	18,721	......	......	......	......	......	......
Depreciated investment in buses at end of year	$8,336	$29,370	$49,645	......	......	......	......	......	......
Operating expenses:									
Gasoline	$2,570	$9,745	$16,199	4.39	4.92	4.87	13.10	13.79	13.12
Lubricating oils	562	3,036	3,080	6.96	1.53	0.93	2.85	4.28	2.52
Tires—customer's list prices	3,168	12,820	16,972	5.42	6.47	5.10	16.20	18.08	13.75
Operator's wages	4,203	15,559	33,973	7.19	7.85	10.21	21.50	22.00	27.48
Operation—sub-total	$10,503	$41,160	$70,224	17.96	20.77	21.11	53.65	58.15	56.87
Maintenance—labor and material	$2,402	$10,230	$14,454	4.11	5.17	4.34	12.27	14.47	11.70
Sundry expense, supervision, minor adjustments, washing and cleaning, non-productive stores' expense and administrative overhead	1,222	5,227	9,386	2.09	2.64	2.82	6.25	7.39	7.59
Miscellaneous expense	195	292	788	0.33	0.14	0.24	0.98	0.39	0.65
Maintenance—sub-total	$3,819	$15,749	$24,628	6.53	7.95	7.40	19.50	22.25	19.94
Insurance (public and passenger liability)	$438	$1,813	$4,363	0.75	0.91	1.31	2.24	2.54	3.52
Garage rental—$10 per bus per month	140	580	1,394	0.24	0.29	0.42	0.71	0.81	1.13
Depreciation	4,164	9,736	18,721	7.13	4.92	5.62	21.30	13.79	15.15
Sub-total	$4,742	$12,129	$24,478	8.12	6.12	7.35	24.25	17.14	19.80
Total operating expenses	$19,064	$69,038	$119,330	32.61	34.84	35.86	97.40	97.54	96.61
License tags and 6 per cent interest on investment	506	1,735	$4,193	0.87	0.87	1.26	2.60	2.46	3.39
Total—operation and fixed charges	$19,570	$70,773	$123,523	33.48	35.71	37.12	100.00	100.00	100.00
Operating revenue based on 5 cents cash fare	26,044	87,259	124,543	44.56	44.04	37.42	133.00	123.10	100.80
Net income on above basis	$6,474	$16,486	$1,020	11.08	8.33	0.30	33.00	23.10	0.8
Net income per passenger carried, cents	1.24	0.94	0.04	......	......	......	......	......	......
Cost per passenger carried, cents	3.76	4.06	4.76	......	......	......	......	......	......
Net income in per cent per year of average investment	51.8	42.2	1.49	......	......	......	......	......	......

It will be noted that the insurance item covers both passenger and public liability. As this item has rapidly become a burden it is questionable whether or not it is advisable to carry such insurance or assume the risk for the operators' account, as is done by other public service corporations.

More Open Cars Converted for One-Man Operation

Large Double-Truck One-Man Cars with Removable Sash Are Made from Fourteen-Bench Open Cars by the Eastern Massachusetts Street Railway

THE Eastern Massachusetts Street Railway has recently completed the reconstruction of thirty-seven former fourteen-bench double-truck open cars for use as one-man cars.

The accompanying illustrations show the original old-style open car body and its transition into a closed one-man car. An interesting comparison is furnished in one photograph between this reconstructed car and one of the standard Birney types of safety car. The car as reconstructed measures 41 ft. over all.

The first step in reconstruction was the removal of practically all equipment, including controllers, air brakes, electrical equipment, seats, running boards and old lighting fixtures. At the right-hand corners the longitudinal body sills were cut away to provide for the new door openings and the vestibule was reinforced with steel castings. The body posts on each side of the car were cut so as to allow the installation of two 2-in. x 8-in. longitudinal trussplanks on each side of the car.

Instead of the usual folding step, these cars were rebuilt with a pair of stationary steps of good width. This was accomplished by cutting quite deeply into the vestibule. Sets of folding doors were provided which are operated by pneumatic door engines, the width of the door opening being 42 in.

These reconstructed cars have a seating capacity of forty-four, with nine cross seats on each side of the center aisle and two 36-in. longitudinal seats at each end of the car. New cross-seat mechanisms were purchased and wooden seats and seat backs were manufactured in the company's shop, utilizing the old open-car seats. These cross seats are 31 in. in width and spaced 30 in. back to back. The width of the center aisle is 24 in. Grab handles are provided.

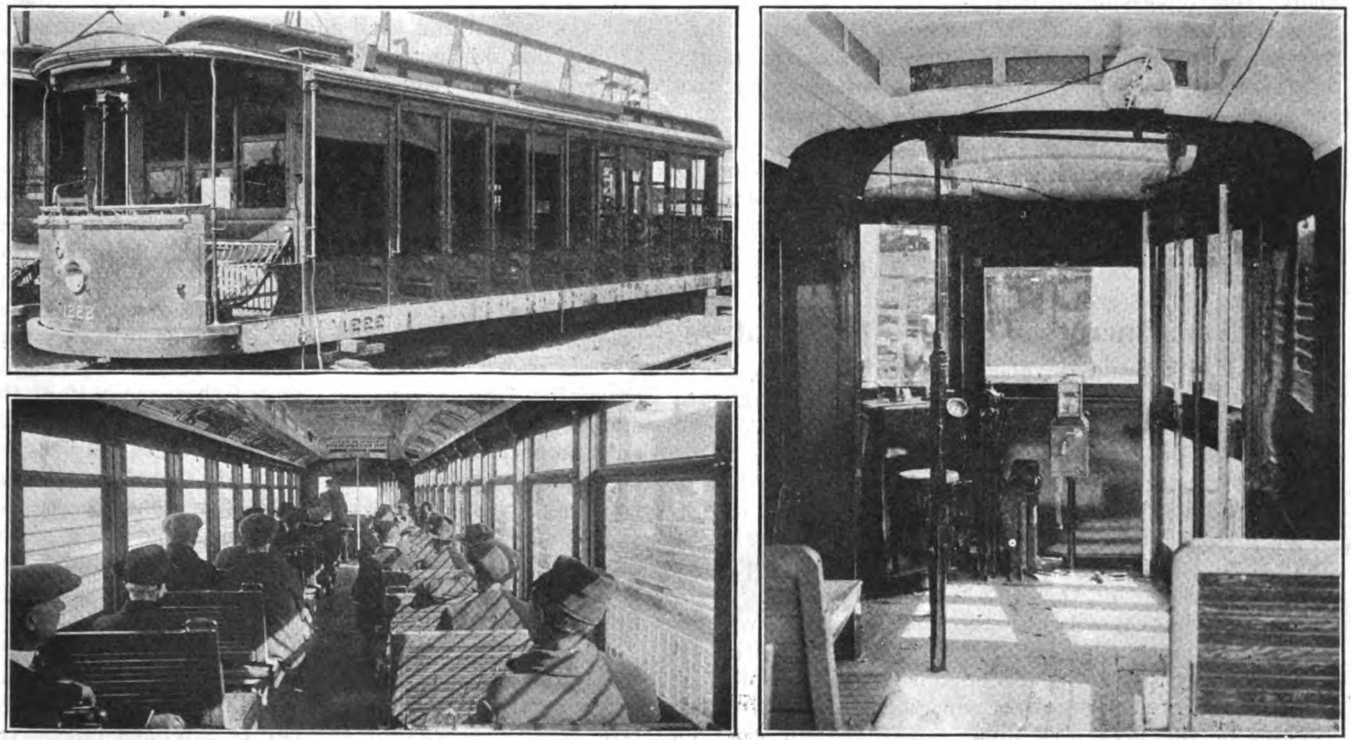
These cars are equipped with sixteen Consolidated cross-seat type heaters which were transferred from obsolete passenger cars. Interior illumination is provided by means of eighteen 23-watt incandescent lamps arranged in two rows along the clearstory.

One of the features of the reconstructed car is the use of portable steel sash, which may be completely removed during the summer if desired. This allows the car to do service practically as an open car. In years past, when this company regularly operated open cars on its lines in summer, it enjoyed quite a fair amount of purely pleasure-riding traffic, as it reaches many popular beaches, lakes and parks and operates through stretches of beautiful country. It is hoped that by making the new cars comfortable and giving them some of the advantages of open cars some extra summer traffic may be developed.

The signal system consists of twenty-four push buttons installed on the body posts between the windows. The Faraday electric line voltage buzzer system is used.

The original air-brake equipment and most of the original electric equipment of the cars were utilized, being replaced after a thorough overhauling.

The arrangement of the operating equipment, including the Johnson fare box, is shown by the accompanying photograph. The fare box is placed close to the dash and almost in the center, where it is most easily reached and watched by the operator but is well out of the way of passengers leaving the car. It is expected that incoming and outgoing passengers will naturally keep to the right.

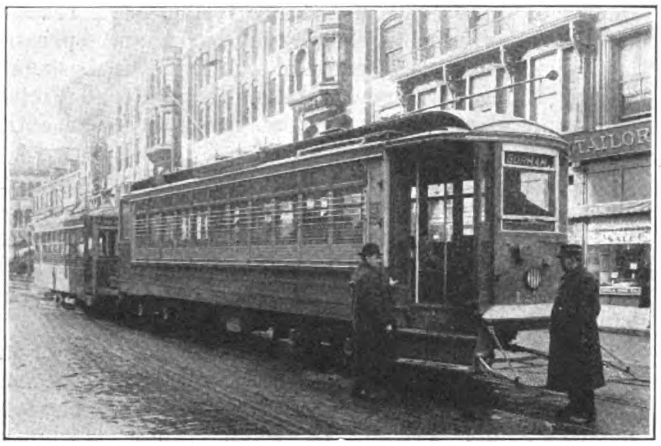


AT TOP, LEFT, OPEN CAR BODY BEFORE RECONSTRUCTION. AT BOTTOM, LEFT, INTERIOR VIEW OF CONVERTED CAR. AT RIGHT, OPERATING END OF REMODELED CAR PHOTOGRAPHED DURING RECONSTRUCTION

The requirements of the Massachusetts Department of Public Utilities have been met by the installation of a safety device, accessible to passangers, which permits of any one shutting off the power, applying the air brakes and unlocking the pneumatic doors at both ends by simply pulling a conductor's valve. This device is described in more detail and the order relating to it is given in an article on page 1175 of this issue.

These reconstructed cars weigh approximately 40,000 lb., completely equipped, and the first few cost approximately $3,000 each. It is believed the cost will be materially less when computed on the entire lot. The work of reconstruction was planned and supervised by W. C. Bolt, superintendent of rolling-stock and shops, and was accomplished in part by the Laconia Car Company, Laconia, N. H., and partly in the railway's shops.

The Eastern Massachusetts Street Railway has already converted into one-man cars a large number of its double-truck box cars of the two-man type, has 250 standard one-man cars in service and has now completed the conversion of thirty-seven former open cars. The trustees have clearly indicated to the public they serve, and to the public officials, that the financial plight of the road is such that it is a case of one-man cars or no cars at all. When their program is complete, and they have already reached 90 per cent one-man operation, there will be only about fifteen two-man cars in operation, out of a total of approximately 600 operating cars. They are now operating one line of double-truck one-man cars into the heart of Boston.



REMODELED CAR WITH BIRNEY CAR AT REAR

Havana Increases Power Equipment

IN MAY, 1920, the Havana Electric Railway & Light Company made a contract with the Westinghouse Electric International Company to furnish two 25,000-kw. turbine-generating units with all auxiliaries. One of these machines is to be shipped about Aug. 1, this year, and the other eight months later. The first unit is to be installed in the present power plant alongside of the existing 12,500-kw. units. The second unit will take the place of one of these 12,500-kw. machines. With this plan the capacity of the present plant will be doubled. The existing boilers, when provided with new high-capacity furnaces and economizers, will be sufficient for the enlarged generating capacity. Except for the receipt of the necessary pipe, valves and fittings, the equipment for eight additional boilers and furnaces for burning Mexican crude petroleum is complete. Any improvements that are to be made in the rest of the boiler plant cannot be determined until the oil-burning equipment has been fully tested.

Manufacturer Pays for Trolley Extension

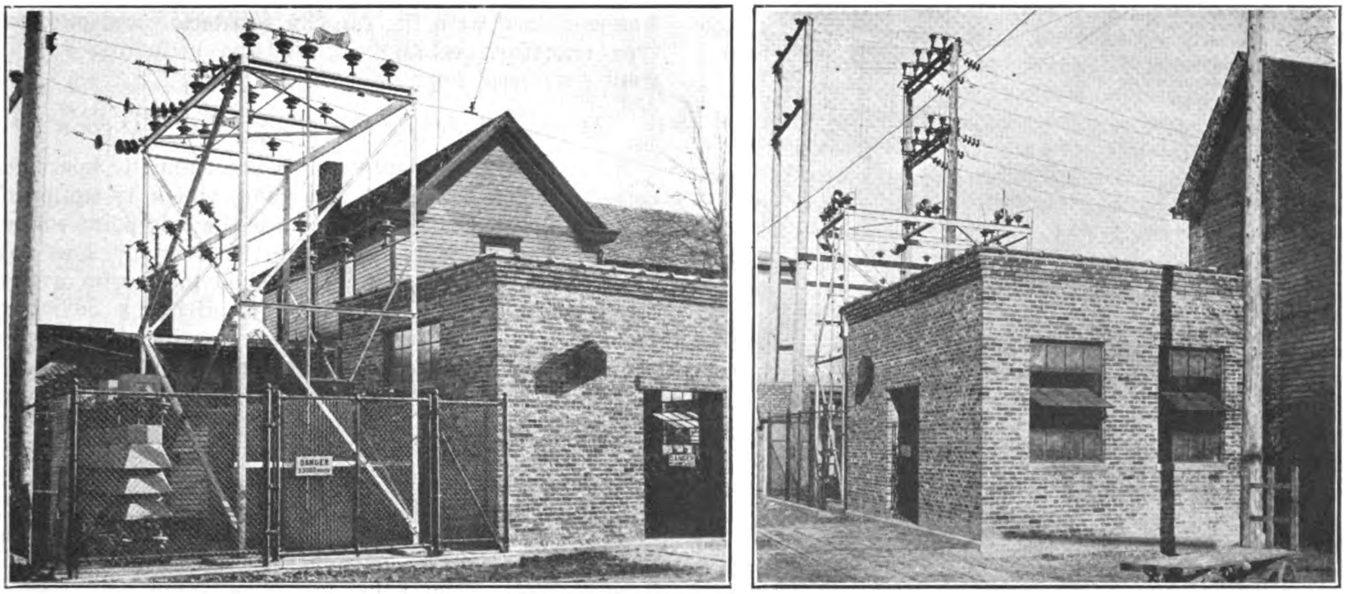
Earnings of Line Are Guaranteed for Five-Year Period—Preferred Stock Given in Exchange for Cost of Construction of the Line

AN UNUSUAL contract for a line extension was entered into in September, 1919, between the Madison (Wis.) Railway and Oscar Mayer & Company, who had built a new packing house a short distance outside of the city. The length of the extension involved was 4,150 ft. and the actual cost of construction was $43,000. Negotiations between the packers and the company resulted in a contract, because of the inability of the company to finance the extension or to see how the line would be self-supporting within five years, and this contract provided that the packer should buy at par preferred stock of an amount equal to the cost of the extension.

The packer deposited in advance in a local bank $30,000, which was drawn upon for the construction work. It was agreed that if the cost of the work exceeded $30,000, the packer was to purchase additional preferred stock to cover that cost. The contract provides that no dividends will be paid for the first five years, but after that they shall become accumulative. The packer guarantees to pay the cost of operation of the extension for the first five years. A minimum service of three hours per day is provided, for which he must pay the company $10 per day. For additional service of the first car in excess of three hours there is a payment of $3 an hour or fraction thereof, with time figured from the time the car leaves the carhouse until it returns. If additional cars are required, a charge of $5 for the first additional car for the first hour, $4 for the second hour and $3 for the third hour, or fraction thereof, is made. For the second and each additional car, a guarantee of $10 per day minimum is made. The hours during which service may be requested are limited to those between 6 a.m. and 9 p.m., with Sundays and holidays excepted altogether.

The packer receives a credit of 5 cents per day per employee in his plant against these guaranteed charges. This credit is given on a monthly basis, but in no case is the credit to be in excess of the amount guaranteed. In other words, in no event does the railway pay the packer any money under this credit provision. The basis of crediting the packer was reached in a way that was intended to eliminate the expense of keeping accounts. The company estimated that one-half of the employees of the packer, on the average, would ride out and back each day. Consequently, 5 cents apiece for all employees per day was taken as the average business that might be expected. If, after five years, the packer should employ less than twenty-five people for a period of one year or more, or go entirely out of business, the company has the right to discontinue service and take up the track.

The extension was built with 73-lb. rail laid on 6-in. x 8-in. x 7-ft. cedar ties on a concrete base and with brick paving. It was made at the end of an existing line, so that service of one car is extended out to the packer's plant in the morning and again in the evening rush hour.



TWO VIEWS OF THE 500-KW. SUBSTATION AT SELLERSBURG, IND., WHICH IS TYPICAL OF THE CONSTRUCTION USED AT ALL RAILWAY SUBSTATIONS

Traction Power Obtained at Lower Cost

Interstate Public Service Company on Indianapolis-Louisville Line, Made Up of Three Once Independent Properties, Inaugurates $40,000 Annual Saving by Rehabilitation of Its Power System—One Automatic Substation Included in Program

THE power supply system of the Interstate Public Service Company of Indianapolis has just been improved.* The work included the shutting down of one direct-current generating station and one 25-cycle generating station, the building of 54.6 miles of new 33,000-volt transmission line and the rebuilding of 58.25 miles of existing transmission lines for higher voltage, the making of arrangements for purchasing power at Louisville and Indianapolis, the junking of the rotary converter and other substation equipment at six substations, the purchase of new converters and switching equipment for ten substations and the erection of six new substation buildings.

Originally, when the line between Indianapolis and Louisville was owned and operated by three different companies, the 58 miles from Indianapolis to Seymour was operated with 600-volt trolley current supplied by a 25-cycle, 370-volt generating station located at Edinburg, Ind., and distributed over a 15,000-volt transmission line extending to Southport on the north and to Reddington on the south and connecting with six rotary-converter substations. The 41-mile section of the line from Seymour to Sellersburg was operated at 1,200 volts trolley potential supplied by a reciprocating engine, direct-current generating plant located at Scottsburg, each engine being direct-connected to two 600-volt generators connected in series. Feeders extended approximately 20 miles each way from this power house. The 14-mile section of the line between Sellersburg and Louisville was operated with a 600-volt trolley current supplied from two converter substations, for which power was purchased from the Louisville Gas & Electric Company and transmitted to it at 4,400 volts. These two substations were operated at 60 cycles frequency and no change in them was required except for the transformers, for which new ones were substituted to receive energy at 13,200 volts instead of 4,400 volts.

LIGHTING AND INDUSTRIAL POWER LOAD INVOLVED

An important consideration involved in the rehabilitation of the power-supply system for the interurban line was the fact that the Interstate Public Service Company also serves the towns of Greenwood, Franklin, Columbus and Seymour with current for lighting and power purposes. This practically necessitated 60-cycle energy, and rather than resort to the use of frequency changers to supply the lighting current for these towns, and because it had been determined that a good economy could be effected through the purchase of power at Indianapolis and Louisville which was of 60-cycle frequency, it was decided to substitute 60-cycle rotary converters for the 25-cycle equipment formerly in use. A 33,000-volt transmission line connecting all of the railway substations and the lighting substation was therefore built and arrangements made with the Merchants' Heat & Light Company at Indianapolis to supply the major portion of the energy required. The existing transmission line, extending from Southport to Reddington, was then reconstructed and spaced for 33,000-volt operation, and extended north about 4 miles to connect with the Merchants' Heat & Light Company transmission system at the city limits of Indianapolis. A new 33,000-volt line was also built from Reddington south to Watson Junction, where it was tied in with the Louisville Gas & Electric Company system by installing 33,000/13,200-volt transformers, the 4,400-volt line from

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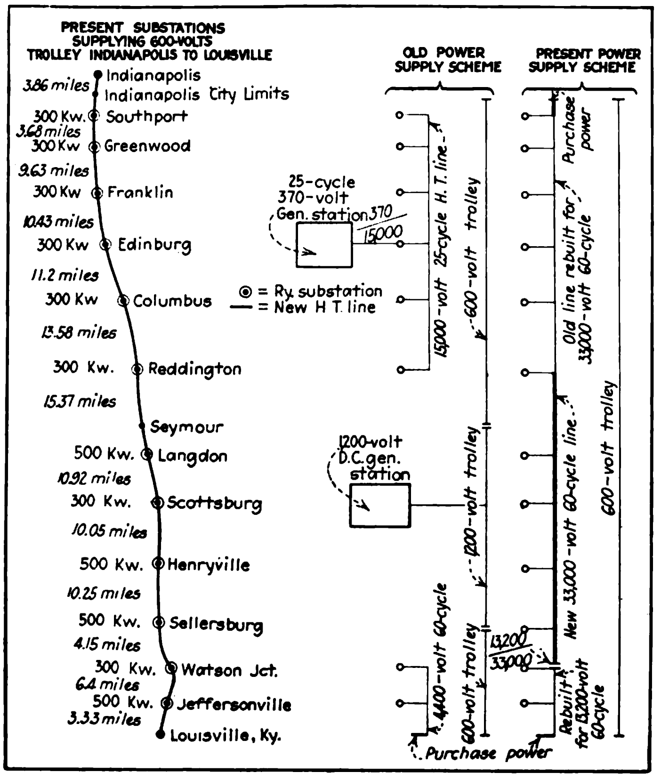
*See articles in issue for June 4, page 1027, for other improvements on this property.


PRESENT SUBSTATIONS SUPPLYING 600-VOLTS TROLLEY INDIANAPOLIS TO LOUISVILLE
Indianapolis
3.86 miles
Indianapolis City Limits
300 Kw. Southport
3.68 miles
300 Kw Greenwood
9.63 miles
300 Kw Franklin
10.43 miles
300 Kw Edinburg
11.2 miles
300 Kw Columbus
13.58 miles
300 Kw. Reddington
15.37 miles
Seymour
500 Kw. Langdon
10.92 miles
300 Kw. Scottsburg
10.05 miles
500 Kw. Henryville
10.25 miles
500 Kw. Sellersburg
4.15 miles
300 Kw. Watson Jct.
6.4 miles
500 Kw. Jeffersonville
3.33 miles
Louisville, Ky.
◎ = Ry. substation
— = New H T. line
25-cycle 370-volt Gen. station
370/15000
1200-volt D.C. gen. station
OLD POWER SUPPLY SCHEME
15000-volt 25-cycle H. T. line
600-volt trolley
1200-volt trolley
4400-volt 60-cycle
600-volt trolley
13200/33000
Purchase power
PRESENT POWER SUPPLY SCHEME
Purchase power
Old line rebuilt for 33000-volt 60-cycle
New 33,000-volt 60-cycle line
Rebuilt for 13,200-volt 60-cycle
600-volt trolley

DIAGRAMS SHOWING PRESENT LOCATION AND SPACING OF SUBSTATIONS AND LAYOUT OF THE OLD AND THE PRESENT POWER SUPPLY SCHEMES

Louisville to Watson Junction having been changed over for 13,200-volt service.

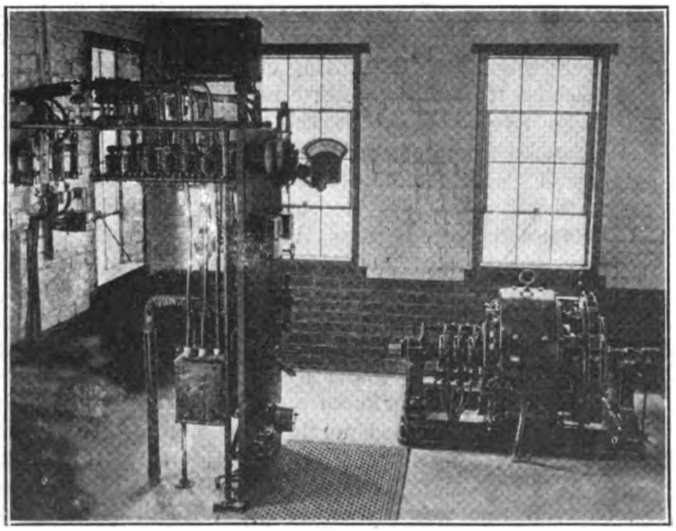
The 25-cycle substation equipments at Southport, Greenwood, Franklin, Edinburg, Columbus and Reddington were replaced with 300-kw., 60-cycle units, and at Edinburg and Columbus the installation included a new substation building. To serve that section of the line formerly operated at 1,200 volts, the old direct-current power house was replaced by four 500-kw., 60-cycle, six-phase, 600-volt substations located at Langdon, Scottsburg, Henryville and Sellersburg. Except at Scottsburg, where the converters and other substation equipment were installed in the shop, new buildings were erected. In all the stations where practical the transformer station for the lighting and power load was combined with the railway substation and outdoor type transformers and high-tension switching equipment were used for both.

AUTOMATIC SUBSTATION LOCATED AT LANGDON

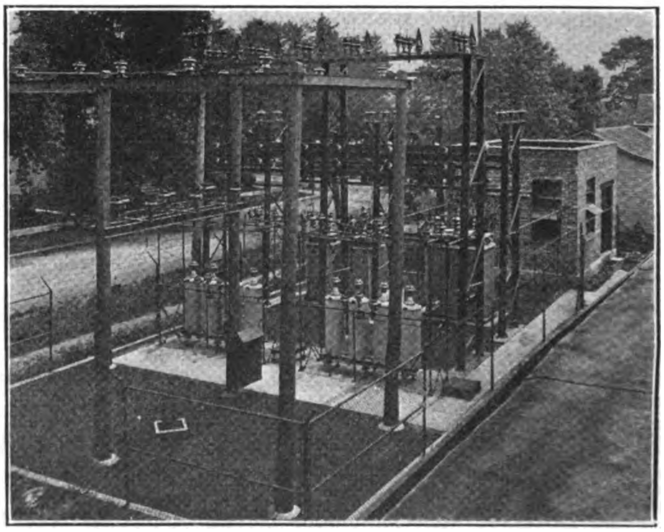
All of the railway substations are manually operated except the one located at Langdon, which is equipped with automatic control. Langdon is the only point where a substation is located at which the company does not have either a station agent or shop man, who would have to be on the payroll anyway. Between Seymour and Sellersburg, where there had been no substations previously, it was possible to locate all of the new substations except Langdon at points where they could be operated by regular employees of the company, so that the saving of labor derived from automatic operation was a factor only at Langdon. It is tentatively planned to install another 500-kw. rotary converter substation at Seymour. Beyond that, future requirements will be secured by installing additional converters in the existing substations, according to present plans.

An accompanying sketch shows the present substation spacing and pictures schematically the old and the new power supply system, from which the changes made can be seen at a glance. Pictures of several of the substations are also reproduced and these are typical of the construction followed throughout the system. The converter is housed in a small square brick building and the transformers and high-tension buses and switches, lightning arresters, etc., are installed outside the building.

A saving in the cost of power of between $12,000 and $15,000 annually was estimated to result from the shutting down of the Scottsburg direct-current power house, and $25,000 additional by closing down the Edinburg alternating-current power house. A total saving of approximately $40,000 a year has thus been made by shutting down the two obsolete power plants and arranging for the purchase of energy. No accurate comparison of the energy consumption per car-mile operated under the improved power and distribution system as against the old system is available owing to the incomplete sets of measuring instruments in use in the old installations.



TYPICAL INSTALLATION OF CONVERTER, SWITCHING APPARATUS, ETC. THIS PARTICULAR PICTURE IS OF THE 300-KW. SUBSTATION AT EDINBURG, IND.



TYPICAL COMBINATION RAILWAY AND LIGHTING SUBSTATION. THIS PICTURE SHOWS THE COLUMBUS SUBSTATION ADJACENT TO CARHOUSE

What Traffic Observations Are Needed

The Information Obtainable from These Observations Is Well Worth the Required Expenditure of Energy —Full Use Must Be Made of All Data Collected

By J. Kappeyne
Railway Engineer, Syracuse

THE necessity of furnishing the best possible service consistent with the lowest possible cost is forcibly being impressed upon nearly every executive in the electric railway field today.

Good railway service requires quick response to the demand for service. Low costs, particularly during periods of high wages, are reflected by high average operating speed.

Schedules indicate the amount and the speed of the service the company purposes to furnish. It becomes, therefore, necessary that the schedules be constantly adjusted with every important fluctuation in the demand for service and that they be frequently revised whenever there exists undue interference with the established speed.

Unfortunately too many schedules are still in effect which were made as applying to conditions which no longer control. Frequently no effective means are taken to keep the traffic department properly informed of important changes affecting the demand for service or the operating speed. Often the old-fashioned method of having inspectors report such changes in conditions as they may have been able to observe gives the only information upon which a revision of schedules is based.

It is essential, in order to keep service and its cost abreast of the times, that systematic traffic observations be made at regular intervals. By properly grouping and analyzing the data collected from a so-called "on and off" traffic survey the following information may be readily obtained:

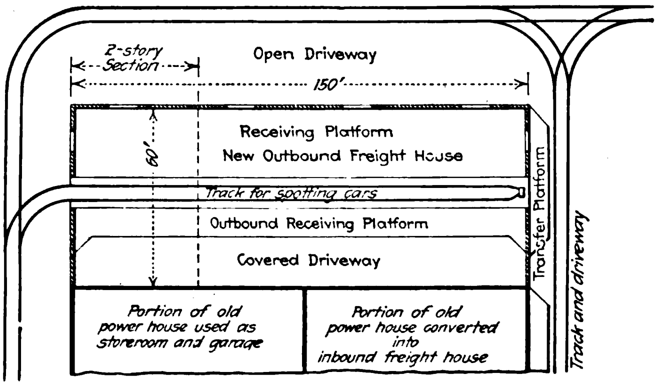
1. The number of passenger-miles, from which may be calculated the average length of ride per passenger.
2. The traffic density, or the average number of passengers per car, which enables the selection of the proper location for collecting multiple fares, and for turning switchback service.
3. The segregation of the profitable from the unprofitable lines, which is determined by the combination of length of passenger haul with traffic density.
4. The passenger traffic flow, which represents demand for service. This, when compared with the number of cars operated, or more correctly the passenger spaces, gives a relative picture of the quality of the service furnished.
5. The maximum load carried, which is the basis for determining the amount of service to be furnished.
6. The diversity factor of demand for service, used in establishing a reasonable standard for service.
7. The length of standing passenger haul, which is a factor to be considered in determining the adequacy of the service furnished.
8. The number and frequency of stops made, generally warranting a revision of car-stop locations.
9. The running time between time points, allowing the checking of schedule time against actual time, and often forcibly demonstrating the necessity of establishing different schedule speeds for various periods of the day.
10. The time when and the location where the lowest car speed is found. This usually indicates maximum interference by other traffic. Where feasible, conditions unduly retarding traffic should be remedied.
11. The greatest number of cars passing a certain point per unit of time, giving an indication as to track capacity and often demonstrating the necessity of rerouting certain cars on parallel streets.
12. The daily passenger load curve, which shows whether the traffic on each end of through lines is properly balanced.
13. The irregularity of headway, obtained by comparing actual headway with scheduled headway. This furnishes a relative measure of the efficiency of the traffic inspectors.
14. The location of points of heavy loading and of frequent interchange of traffic, indicating where inspectors should be stationed in order to give assistance to the greatest number of the riding public.

Railway officials are not always fully alive to all of the information obtainable from such a traffic survey. Frequently a survey is made with one particular object in view and the analysis of the other obtainable results is neglected.

If full use is not made of all the data collected from traffic observations, an opportunity may be lost to improve the service or to reduce the cost thereof.

New Terre Haute, Indianapolis & Eastern Freight House

THE Terre Haute (Ind.) Division of the Terre Haute, Indianapolis & Eastern Traction Company has recently completed a new outbound freight house for the convenience of Terre Haute shippers. The building is constructed of brick and is 150 ft. long by 50 ft. wide, with a two-story section along the front to provide office quarters on the second floor. An idea of the floor plan of the building, track layout to serve it, etc., may be gained from the accompanying sketch.


2-story Section
Open Driveway
150'
60'
Receiving Platform
New Outbound Freight House
Track for spotting cars
Outbound Receiving Platform
Covered Driveway
Transfer Platform
Track and driveway
Portion of old power house used as storeroom and garage
Portion of old power house converted into inbound freight house

SKETCH SHOWING FLOOR PLAN AND TRACK FACILITIES FOR NEW TERRE HAUTE FREIGHT HOUSE

Freight is received for shipment either from the outside driveway, clearly shown in the accompanying picture, or in case of bad weather or congestion teams can also deliver their loads by way of a covered driveway on the opposite side of the building. The handling of shipments is minimized by placing the names of different shipping points over the four receiving doors along the open driveway. The only trucking required then is to remove the merchandise from these doorways across the platform to the cars, which are spotted on a track extending through the center of the building.

There is a platform between the track and the driveway on either side of the track. The platform floors in the new building are made of concrete. The work of billing merchandise is facilitated by the installation of automatic springless weighing scales.

At the rear of the building a platform has been provided for convenience in transferring shipments from the inbound freight house to the outbound house. The inbound freight house is what formerly was the boiler room of a large power house which stands adjacent to the present new outbound freight house.

The Street Railway "Auto-Superintendent"

A Talk to Railway Managers About the Use of Automobiles by Railway Officials and the Effects of This Practice

(Contributed by the Manager of a Western Property)

HAVE your superintendent and inspectors acquired the automobile habit? If they have not your company is to be congratulated, for, once this habit is acquired, you lose the service of a once efficient official.

To learn if your superintendents and inspectors have formed the habit, you need not follow them about the city. These facts will come to you in the form of complaints from the few street car riders that are left to support street railways. These complaints will cover discourteous treatment by motormen and conductors, failure to stop for passengers, objectionable smoking and spitting in cars, dirty cars, employees smoking on duty, accidents caused by motormen entertaining friends on the front platform, failure properly to safeguard the infirm, the very old and the very young passengers and a good many other complaints of a quite similar nature.

You will also hear from the city officials. Your right-of-way pavement is being neglected, unpaved portions of the track are not kept ballasted, sprinkling of right-of-way is indifferently done, bad low joints are in the track and the traffic ordinances are continuously being violated by motormen.

You will also hear from the bondholders and you will explain to them that the automobile travel is cutting into your gross revenue. So it is, but much of the fault lies with the official who has formed the automobile habit. It becomes too slow for him to ride any longer in the street cars, yet he expects other people to do so. It is pleasant indeed to a motorman or conductor, and to the passengers, on a slow-going street car, to have the street railway superintendent frisk past the street car in his automobile, at a high rate of speed, and "give his dust" to the people in the street car. Not a good example to set as a business getter. It makes a passenger feel that "the world owes him an automobile." He might even feel that his money is helping the corporation buy automobiles for its officials and that street railway fares are entirely too high. Office work is real irksome to the joy-riding official. He neglects this entirely or puts it off for a stormy day when automobile riding becomes unpleasant.

The writer believes that the day is not far distant when owners of public utilities will check up on their automobile expense and eliminate some of the joy riders. They can be found on the payrolls of electric, gas and water companies as well as the street railway company.

Letters to the Editors

"Get the Young Engineer While the Getting Is Good"

To the Editors:

In reading the June 4 issue of the ELECTRIC RAILWAY JOURNAL I found the following article: "Get the Young Engineer While the Getting Is Good." This article takes up the slowness of electric railways in absorbing young engineers into their organization.

I have just been graduated from the University of ——— with the degree of bachelor of science in electrical engineering. I desire very much to attach myself to some electric railway company and "make good" with that company.

Since you are in touch with the various electric railways of the country, perhaps you know of some opening for a young engineer. If so, will you please let me know to whom I should apply.

1921 GRADUATE.

[If any one is looking for a young man like this, his name and address may be had on request.—EDITORS.]

Single Entrance Satisfactory in Terre Haute

TERRE HAUTE DIVISION, TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY

TERRE HAUTE, IND., June 15, 1921.

To the Editors:

It would seem to me that the very excellent letter of Mr. Gove in your issue of June 11 would serve to close the discussion of safety car design standards that has been had in the ELECTRIC RAILWAY JOURNAL during the past few months, and which I have followed with keen interest.

Perhaps you would not object to granting the privilege of your columns for just a word of approval of those who have urged sticking to Birney car standards.

Some months ago the writer made the statement that we attributed a large measure of our success in the operation of Birney cars to the fact that we had adhered religiously to the standards set by the designer and builder, taking on only such changes on our various and progressive purchases as had been incorporated by the designer and builder for the sake of improvement over the original design. These have involved only an improved truck design and a change in the operator's seat. The statement referred to would be just as true today.

Perhaps the operation of safety cars very nearly six million car-miles in the last two and one-half years and the operation of 100 per cent safety car service during the last six months entitle us to express an opinion. At any rate we have not seen any of the changes in design of the Birney car that, to our mind, improve its serviceability or its adaptability.

We have operated the standard car with every varying degree of density of traffic from 15 cents to 54 cents per revenue car-mile (daily average of 5-cent fare) and we are still "for" it.

I think that some of us tend to the feeling that it is up to us to do not only our own thinking but that of the public as well. The human race adapts itself to conditions and does not willingly change those conditions as long as they are comfortable and reasonable. The Liberian negro, accustomed to carrying his load on his head, still continued to do so even after the white man had furnished him a wheelbarrow.

I have seen in one of our large cities the bulk of the short-haul passenger traffic handled by motor buses of a seating capacity of twelve to twenty, each of these buses with only one door for both loading and unloading. I doubt if there is a demand on the part of the bus passengers or a serious thought on the part of the bus owners themselves to alter the design of these buses so as to facilitate loading, unloading or provide more standing room.

It seems that many are still of the opinion that the safety car is a small town car and that its design, to make it adaptable to large cities (which after all are in the main simply groups of smaller cities) must be modified or changed. Yet our experience convinces us that a property earning anywhere around 30 cents per car-mile (on the basis of a 5-cent fare) at one-minute headway has a fertile field for the safety car of standard Birney design. E. M. WALKER.

Railways Should Be Protected Against Unjust Competition

THE SOUTHWEST MISSOURI RAILROAD

WEBB CITY, MO., June 11, 1921.

To the Editors:

When hard surfaced roads are built parallel to steam or interurban lines and are thrown open free to the use of the heavy truck, whose driver many times has little regard for other travel, there is little benefit to the farmer, manufacturer, business man, pleasure rider or consumer. The construction of these roads places an additional burden in the way of taxes, serves only a small portion of the country and allows certain classes to pursue their occupation without paying anything toward road building or upkeep. Eventually such road construction makes the consumer pay more for what he buys and the producer realize less on what he has to sell.

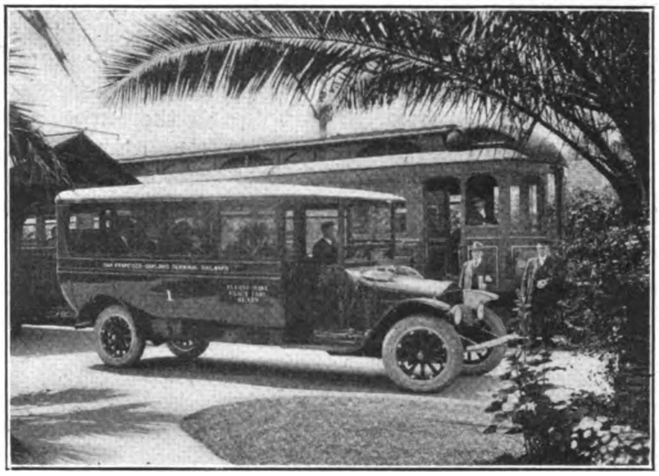
Not many of us ever stop to figure out who it is that is furnishing the money for building good roads, nor what the motive may be when certain routes are selected. But when the acts of a few men directly or indirectly cripple our large enterprises by taking away the cream of their business, the community at large must pay the bill. Let us not fool ourselves nor be fooled by the silver tongued orators into the belief that business can be successfully carried on without invested capital. It makes no difference whether this money is furnished by the federal, state or county authorities or by private subscriptions. Those using these roads for their own business should pay liberally toward the upkeep. The financial standing of a well-managed railroad and public utility is as vital to the life and development of a community as its financial and commercial institutions and should be protected against unfair attacks or unjust competition, so that its customers may receive full benefit derived from such enterprises.

Many of the good old American type of citizens, who believe in equal rights and justice to all, have been slumbering on their rights for years, knowing they were surrounded by Nature's gifts in profusion. They have expected both the commercial and civic interests to develop, while they sleep on until the country has reached a point where it needs the advice of wise and conservative men. Extravagance, shiftlessness and disregard for the rights of others were some of the lessons learned from the world war. Railroads, public utilities, trucks and automobiles, each has its field and all are essential in the development of our commercial interests. Good roads are needed to develop our resources in every section not served by other means of transportation, but we shall be going backward in a commercial way when we allow these roads to be built and used to cripple other enterprises.

E. J. PRATT,
General Manager.

Key Route Starts Bus Operation

THE San Francisco-Oakland Terminal Railways, Oakland, Cal., in May, 1921, opened a new line, using gasoline driven motor buses. This line serves as an extension of the company's rail service and extends from the Fortieth Street Station up Piedmont Avenue, thence over the so-called old Moraga Road to the townsite of Montclair, a distance of 291 miles. Four buses have been purchased and two are needed to fill the twenty-minute headway that is maintained from 5:40 a.m. to 8:40 p.m.



THE KEY ROUTE SUPPLEMENTS ITS RAILWAY SERVICE BY OPERATING A LINE OF MOTOR BUSES

Special bodies were built by A. Meister & Son, Sacramento, Cal., and have a capacity of eighteen seated passengers. The bodies are mounted on a 2½-ton White truck chassis of standard design and support. Pneumatic tires are used. The original equipment consisted of Firestone cord tires throughout.

The basic rate of fare for a ride on the bus is six cents with free transfers to and from the city line with which it connects, but no free transfers are issued to the suburban line for San Francisco, with which it also connects.

The underlying reasons for putting in buses in preference to rail service are stated as being purely economic.

The company estimates that with an investment of $26,000 for the four buses, as against one of $138,000 for rail cars and overhead wires including feeders, the service rendered can handle the traffic to be developed for the time being.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

New Cars for San Francisco

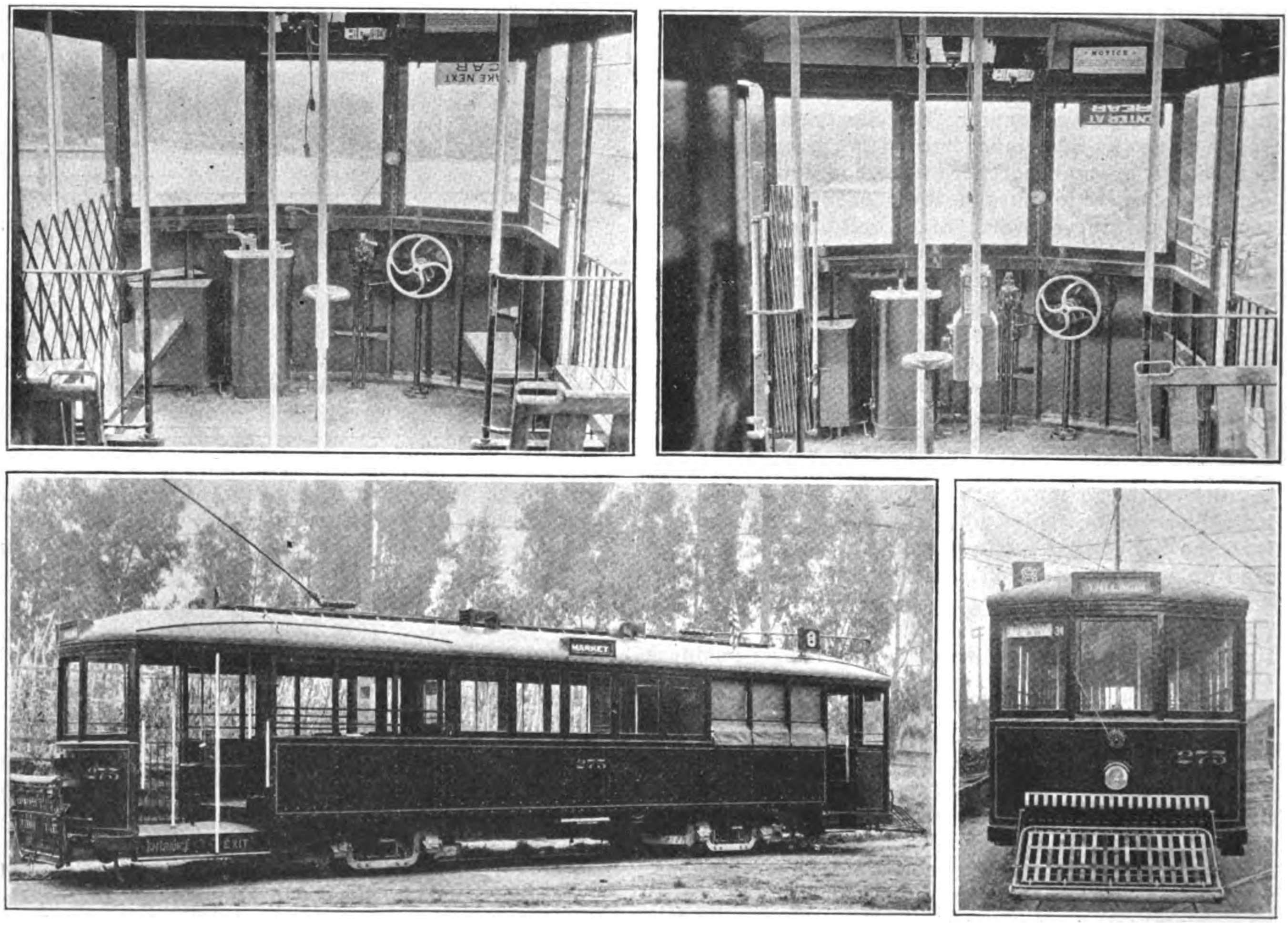
Car Bodies with Steel Sides Applied to a Wooden Framework Built in Shops of United Railroads—Trucks and Motors Taken from Cars that Have Become Obsolete

THE United Railroads of San Francisco have been building their own car bodies since 1913 and have been previously equipping them by using trucks and motors from cars that have become obsolete. During 1920 twenty cars were built and eleven of these have now been placed in service, these cars being equipped with new trucks and electrical equipment.

The new cars are of the open-end type, having a closed central portion 15 ft. 6 in. long with an open portion at either end 8 ft. 5 in. long with a platform 7 ft. 4 in. long. This type of car is popular in California as, due to the local climate, passengers can ride in the open section with comfort during the entire year. The closed section of the car has longitudinal seats, while the open one has four cross seats and two short longitudinal seats, seating two passengers each. There are also four upright stanchions on either side of the car in the inclosed portion. These are made of ¾-in. pipe and extend from the floor to the roof, acting as grab handles, seat supports, roof stiffeners and seat spacers.

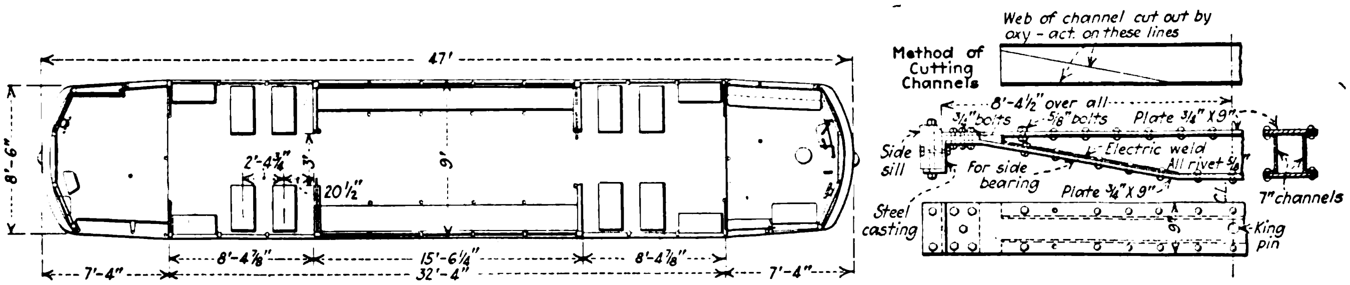
The car body consists of a wooden frame with No. 12 gage steel sides. The entire bottom framing and all posts and plates are of Oregon pine. The inside finish of the closed section is of gum and the sash are of teak. No headlining is used in the car. The entire ceiling is painted a light drab and all stanchions white. Due to the severe dips in the track that exist at junctions of track on steep grades and level track it is impossible to use a lower step of less than 15 in. in height. The platforms have a 2-in. ramp and also a 2-in. crown. There is also a 2½-in. ramp from the end sill to the center of the bolster. The bolster used, as shown in an accompanying illustration, is of somewhat unusual construction. The top consists of a straight plate, while the bottom member has very slight offsets and the end angle is a machined steel casting. The fillers consist of two 7-in. channels, as shown.

Accompanying illustrations show the appearance of



AT TOP. TWO INTERIOR PLATFORM VIEWS; AT BOTTOM, SIDE AND END VIEWS OF THE NEW CAR the car. The open-end portions are equipped with storm curtains, the three curtains for each side being fastened to one roller, which is entirely under the control of the car crew, so that passengers cannot lower or raise them. When in the down position the curtains are fastened to the outside of the car by hooks and tightened manually.

All lighting wires, auxiliary and trolley wires are carried in wooden ceiling moldings which run straight through the car from end to end, and all switches are located above the motorman's head. The power cables are inclosed in a box in the body section of the car and run in duraduct from end sill to controller. Conduit is used for motor leads and resistance wires.



AT LEFT, SEATING PLAN OF NEW SAN FRANCISCO CAR. AT RIGHT, BOLSTER CONSTRUCTION

The car seats fifty passengers and weighs 36,000 lb. complete. The trucks with wheels and axles weigh 11,560 lb. and the motors, gears, pinions, etc., 7,760 lb. The car body with all attachments weighs 16,680 lb. The trucks are the Standard 0-40 double-truck type with 4-in. axles and 30-in. wheels. Other equipment details consist of the following: Four GE-247-D 40-hp. motors, two K-28-E controllers, two MA-13 fuse boxes, two MR-13 circuit breakers, two US-15 trolley bases, one DH-10, 10-ft. Westinghouse compressor, one 8-in. brake cylinder, one type E-1 American slack adjuster, one 16 x 45 air reservoir, one Westinghouse type H-1 emergency valve, two conductor's valves, U. R. R. car signs, Johnson fare boxes, Golden Glow headlight.

Safety Devices on Bay State Cars

Ways in Which Eastern Massachusetts Street Railway Is Equipping Its One-Man Cars to Conform to the Order of the Department of Public Utilities

By W. C. Bolt
Superintendent of Rolling Stock and Shops, Eastern Massachusetts Street Railway, Chelsea, Mass.

ON NOV. 8, 1920, the Department of Public Utilities of the Commonwealth of Massachusetts entered an order relating to safety devices on street railway cars. One of the requirements of this order called for the installation of additional safety devices on so-called one-man cars. The section of the order follows:

> Every street railway car operated by and in charge of one man shall be equipped with either (1) a device so designed and maintained that upon the release of the controller of the car by the operator the motive power will be cut off from the propelling motors of the car and the brakes will be applied, together with a device located in a conspicuous place to the rear of the front platform and vestibule of the car and accessible to passengers by the operation of which a door at the rear of the car will be unfastened so that it can be opened from the inside of the car, or (2) shall be equipped with a device located in a conspicuous place to the rear of the front platform and vestibule of the car and accessible to passengers by the operation of which the motive power will be cut off from the propelling motors, the brakes applied and a door at the rear of the car unfastened so that it can be opened from the inside of the car. Instructions as to the location of said devices accessible to passengers and their use in an emergency shall be posted in a conspicuous place in the car.

The first part of the above order referred to the standard Birney car, and to conform with the requirements of the Department of Public Utilities, as applying to the 250 Birney cars which the Eastern Massachusetts Street Railway now has in regular operation, a standard conductor's valve is being installed, located in the center of one side of the car immediately below the advertising rack molding. This conductor's valve is connected with the emergency control line by means of a ⅜-in. pipe. The operation of this valve by a passenger will apply the emergency brakes, cut off the power from the propelling motors and unlock the rear door, as well as supply sand to the rail. The following sign is being installed adjacent to this conductor's valve instructing passengers in the use of the valve:

EMERGENCY VALVE
In case of accident, PULL CORD *to stop car*
and unlock rear door

The second section of the order relates to cars which are not equipped with the standard safety devices and applies specifically to some 420 double-truck cars which the Eastern Massachusetts Street Railway is operating on the one-man plan at the present time.

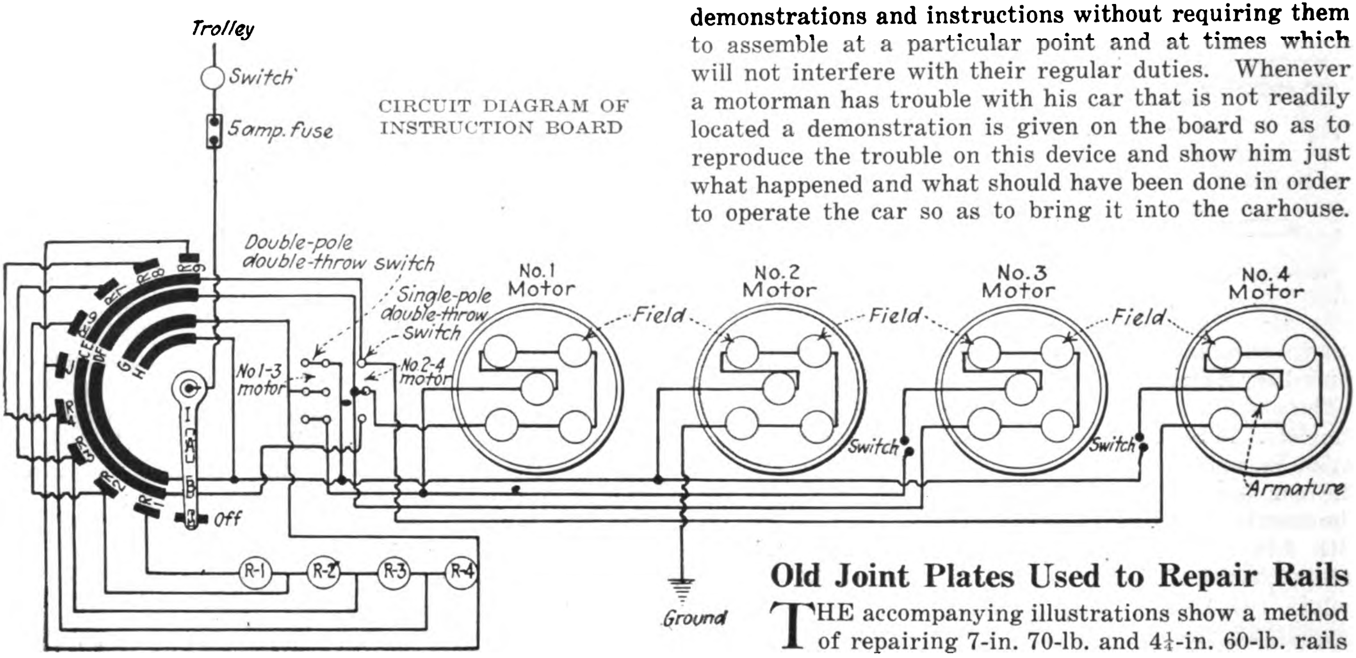
To conform with the order, as applicable to these double-truck, one-man cars, our company made a thorough study of the problem in conjunction with the leading equipment manufacturers, which resulted in the installation of the following equipment: Each car will be equipped with a conductor's valve located in the center, on one side of the car. This conductor's valve is connected with an emergency valve located on the inside of the car, underneath one of the seats, and is also connected with two pneumatic door engines; one on the right-hand door of each vestibule. A separate pipe line operates a small circuit breaker knock-out cylinder and, when application is made, throws the master control switch, thus cutting off the power. On some cars which are not equipped with a master control switch, two small knock-out cylinders are installed, throwing the two circuit breakers. On other cars the knock-out cylinder operates a small control-circuit switch.

To provide sufficient reserve of air in case of emergency, an additional air reservoir is likewise being installed on these cars, thus providing reserve air which is passed directly into the brake cylinder. When the installation is complete, any passenger, in case of accident, by pulling the cord attached to the handle on the conductor's valve, can shut off the power from the propelling motors, apply the brakes to the car and unlock the rear door of the car, thus performing the functions required by the Public Utilities Department. A sign similar to the above is being installed on these cars also.

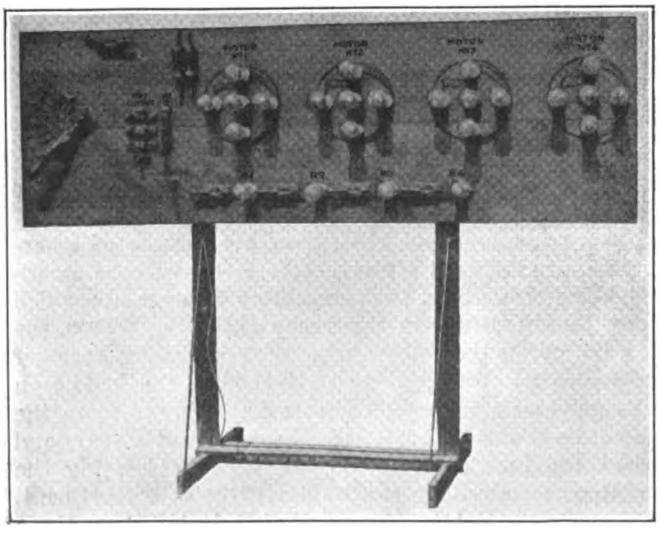
Portable Instruction Board

Device in Use by the Kentucky Traction & Terminal Company for Instruction of Motormen Has Proved of Great Assistance in Insuring the Proper Operation of Cars and Equipment

THE accompanying illustrations show a portable instruction board designed by E. M. Carr, general shop foreman Kentucky Traction & Terminal Company, for use on its system to instruct motormen in the various operating circuits of cars. The board shown is for a four-motor equipment, but a similar board can be used for a two-motor equipment if desired. The circuits through the motors and resistors are indicated by lamps. The motor circuits consist of four groups of 23-watt Mazda lamps, each group consisting of five lamps and each group representing a motor. Of the lamps in each group the center lamp represents the armature and the four other lamps the four field coils. Four lamps located at the bottom of the board represent the car resistors. The several steps of the controller are provided by operating the rheostat at the left of the board. By feeding this controller a notch at a time, the exact conditions under which the motors successively receive their current are shown.


Trolley
Switch
5 amp. fuse
Double-pole double-throw switch
Single-pole double-throw switch
No 1-3 motor
No 2-4 motor
No. 1 Motor
No. 2 Motor
No. 3 Motor
No. 4 Motor
Field
Field
Field
Switch
Switch
Armature
I
A
B
Off
R1
R2
R3
R4
R5
R6
R7
R8
R9
E
F
G
H
R-1
R-2
R-3
R-4
Ground

CIRCUIT DIAGRAM OF INSTRUCTION BOARD



PORTABLE INSTRUCTION BOARD

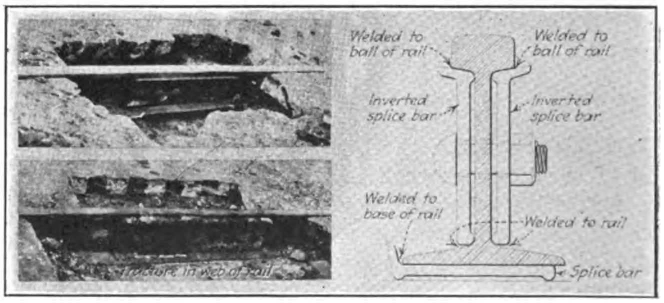
Defects in motors, cables, rheostats, etc., are imitated by unscrewing lamps from the sockets so as to break the circuits and by the use of cut-out switches shown on the board. These cut-out switches are also used to demonstrate how a car which may "have trouble" can be operated. The circuits are arranged so that they can be operated on 500 or 600 volts as available.

As the board is portable it can be taken to the different carhouses on the system and motormen can be given demonstrations and instructions without requiring them to assemble at a particular point and at times which will not interfere with their regular duties. Whenever a motorman has trouble with his car that is not readily located a demonstration is given on the board so as to reproduce the trouble on this device and show him just what happened and what should have been done in order to operate the car so as to bring it into the carhouse.

Old Joint Plates Used to Repair Rails

THE accompanying illustrations show a method of repairing 7-in. 70-lb. and 4½-in. 60-lb. rails used by the Springfield Traction Company, Springfield, Mo. Previous to the use of this method the practice of the company was to cut out the defective sections of rail and replace with sections about 8 ft. long. This method of repair required two sets of joint plates, and in addition the expense for cutting out the section was somewhat high.

The method now used consists of using old continuous joint plates by cutting off the portion that goes underneath the rail but leaving the flange at the other end. These plates are applied to the joints with the wide flange uppermost as indicated in the accompanying illustration. In addition to using one of these joint plates on either side of the T-rail an additional plate is placed underneath the rail joint and all three plates are welded along the edges as indicated. This type of construction has proved extremely satisfactory on a line with two and one-half minute headway.


Welded to ball of rail
Welded to ball of rail
Inverted splice bar
Inverted splice bar
Welded to base of rail
Welded to rail
Splice bar
Fracture in web of rail

AT TOP, LEFT, JOINT READY FOR WELDING; AT BOTTOM, LEFT, JOINT WITH REPAIRS PARTLY COMPLETED; AT RIGHT, INVERTED SPLICE BAR WELDED RAIL JOINT

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

$4,000,000 for Improvements

Mr. Mitten Plowing Money Back Into Property and Increasing the Stockholders' Equity

Approximately $4,000,000 from earnings will be plowed back into the property of the Philadelphia (Pa.) Rapid Transit Company during 1921 in additions and improvements. According to President T. E. Mitten adequate provision for necessary repairs, renewals and improvements could not be made during the wartime period. Militating against carrying out the work then were the high cost of material, the impossibility of securing sufficient labor and the money shortage due to delay in securing increased fare.

The very extensive program of repaving undertaken by the city requires during this year the rebuilding of more than 90 miles of track construction, or more than double the usual undertaking. Besides there are more than 60 miles of trolley wire renewals, and certain car improvements, representing the making of center exits on near-side cars, the purchase of one-man cars for the unimportant outlying lines, the purchase of modern snow sweepers, and additional shop and carhouse facilities.

Of this $4,000,000 which it is planned to spend $2,000,000 represents renewals to property and will therefore be added to operating costs. The remaining $2,000,000, representing additions to property, is properly capitalizable, but because of the fact that the company has no securities now salable from which new capital can be secured, the estimated $2,000,000 of net earnings for 1921 which would otherwise be available for dividends on stock must be used to meet the cost of this new construction.

The practice of appropriating Philadelphia Rapid Transit surplus to provide for the capital needs of the property conforms with the procedure of the past ten years of the present management. During that time there was earned a surplus of $10,051,000. Of this, however, only $5,846,000 was declared in dividends. The remaining $4,195,000 has been used for construction purposes and acquiring new property.

In the matter of traffic handled Mr. Mitten stated that for each of the ten years 1911-1920 there was an average yearly increase of 46,827,145 passengers. The system, however, during the first five months of 1921 not only suffered the loss of this normal increase, which approximates 4,000,000 passengers per month, but has actually carried 24,401,705 fewer passengers than were carried during the same months of 1920. In May alone the traffic decreased 10 per cent, which, if it continues, will mean supplying the public with 10 per cent better service.

Passenger earnings for the first five months of 1921 increased $2,451,456 over the corresponding period of 1920. Mr. Mitten says that $4,500,000 of increased passenger earnings for the full year 1921 as compared with 1920 is all that can be now counted on in view of this declining rate of monthly increase. Operating costs are higher because of the increased allowance required for renewal account necessary to make the desired improvement in the condition of the property. This, together with sundry improvements in service, will not only use up the money saved through decreased wages, but in addition serve to increase considerably the total costs of operation. The net income for the year 1921 is estimated at $2,000,000.

Pittsburgh Receivers Authorized to Start Improvements

The receivers for the Pittsburgh (Pa.) Railways have been authorized by the United States District Court to proceed with the company's share of the work of widening East Carson Street from the Smithfield Street Bridge to South Seventh Street. This authorization has eliminated litigation which threatened a long delay in the work as the city had previously filed a bill in equity asking that the receivers be compelled to perform this work. Litigation over this bill would have delayed the improvement for months as had there been an adverse decision in the suit in the District Court the city had intended to appeal to the higher Federal courts.

The thoroughfare, one of the big municipal projects, is to be widened from a 50-ft. to a 75-ft. street, at a cost of $500,000. The cost to the receivers of the Pittsburgh Railways will be $115,000. The receivers asked the court for the authority to do the work. With this permission granted it is hoped to have the work finished by October. The railway will relay and realign its tracks, relay the paving within the track area and 1 ft. on either side with reclipped stone block paving, and make such changes as are necessary in the overhead construction.

Trackless Trolley Considered for Toledo.—Street Railway Commissioner Cann at Toledo, Ohio, is collecting data on the trolley bus and has already intimated that such cars may be used to provide a new cross-town line in that city.

Arbitrators Cut Wages

Men on New York State Lines Reduced 11.7 per Cent—Maximum for Trainmen Fifty-three Cents.

Motormen and conductors of city lines of the New York State Railways will get a basic wage rate of 53 cents an hour from May 1 of this year to May 1, 1922, under an award announced on June 18 by the arbitration board, consisting of Judge Arthur E. Sutherland, impartial member, and B. E. Tilton and James H. Vahey, representing the company and the Amalgamated Association, respectively. This is a reduction of 11.7 per cent under the basic rate of 60 cents an hour of the 1920 agreement.

By this award motormen and conductors serving for the first three months will get 49 cents an hour, for the next nine months 51 cents, and after a year the full 53-cent rate. The pay of shop men and miscellaneous employees is reduced 2½ per cent from the rate fixed a year ago, and watchmen, car cleaners, car washers, track sanders, track cleaners, flagmen at crossings, chauffeurs, car placers and unskilled laborers generally are reduced 15 per cent.

Under this award the lowest rate that will be paid will be to unskilled carhouse and other laborers. They will get 42½ cents an hour.

There were 102 proposed changes in the working agreement, most of which were disposed of by agreement between Mr. Tilton and Mr. Vahey without the interposition of Judge Sutherland. Few changes, however, over the 1920 agreement were decided on, and those that are made were decided on in the expectation they will result in betterment of service and will tend to greater efficiency and simplicity of operation without injustice to anyone. The provision for the basic nine-hour day is continued, with a leeway of three-quarters of an hour to complete schedules when necessary.

No important changes are made in the matter of "swing" runs. The company proposed they should be completed within fourteen consecutive hours and in no case exceed fifteen hours. The 1920 contract provided that at least 60 per cent of all schedule runs shall be laid out with outside time not to exceed eleven hours, and "in no case is a schedule run to have outside time in excess of fourteen hours." Provision for overtime extra under this clause, in the 1920 contract, is discontinued, however, but the men are given the option of working this overtime.

By the award motormen and conductors on interurban lines of the company will get a basic rate of 55 cents an hour. For the first three months they get 4 cents an hour less and for the next nine months 2 cents an hour less. Lines affected are the Utica Interurban, Sodus Bay Line, and the Rochester & Eastern. Men of the Oneida line get 3½ cents an hour more.

The award provides that operators of one-man cars, now running in Syracuse and contemplated for Utica, shall get 5 cents an hour more than motormen and conductors. This is the demand made by the men.

All three of the arbitrators signed the award.

City Outgeneraled by Company Talent

Paul H. Maloney, Commissioner of Public Utilities at New Orleans, La., in a lengthy report to the Commission Council on June 14, confirms the opinion generally prevalent that the present city administration is unable to cope with the traction problem and is sorely in need of men with proper training and experience adequately to safeguard the interests of the city. He said:

> It must be remembered that the present administration is a new one, unfamiliar with the affairs of the city of New Orleans and without the benefit of experience or expert training and advice.

He contrasted the position in which the city now finds itself with that of the New Orleans Railway & Light Company, with its formidable array of legal and engineering experts, who were, he said, conducting a "propaganda campaign" against the city authorities, through C. C. Chappelle, whose plan Mr. Maloney rejected.

Mr. Maloney thought the Chappelle plan was formulated for the purpose of "undermining the Commission Council rather than to seek a settlement based upon a fair and equitable basis." He believed the city authorities had "piddled" long enough with the situation. The time had come, he said, when definite and concerted action should be taken by the Council. He pleaded for an organization of experts in banking, engineering, accounting and law which would be able to assist the city in its battle for reasonable rates and service.

Mayor McShane concurred in the views held by Commissioner Maloney.

Commissioner Black believed that Commissioner Maloney's suggestion was one that should have been carried out long ago. He said:

> We have been going around armed with a sling shot to attack an entrenched giant. We must arm ourselves with a weapon that will dislodge the forces against us and we cannot do it without the assistance of technical men to supply the things we need.

Mr. Murphy, of the committee on finance, objected to the immediate adoption of the Maloney plan, because of the financial outlay involved.

The report was referred to the committee on finance. It will come up for discussion and consideration at the next meeting.

More Wage Cuts

Arbitrators Reduce Wages Below Offer of Company, Which Men Rejected —48-Cent Maximum

Platform employees of the Cincinnati & Dayton Traction Company will receive a maximum wage of 48 cents an hour, in the case of those employed on the interurban division, and 45 cents an hour in the case of those operating on the Hamilton city cars and the Dayton city cars, as a result of the decision of the board of arbitration agreed upon to settle the controversy between the company and Division 738 of the Amalgamated Association. The board completed its work a short time ago, with the vote of the men's representative dissenting.

STATE INDUSTRIAL COMMISSION APPOINTED THE REFEREE

The board was composed of Mahlon Gebhart, Miamisburg, representing the employees; Samuel D. Hutchins, Columbus, representing the company, and Prof. Joseph S. Myers of Ohio State University as the third arbitrator, or referee. The referee was chosen by the Ohio Industrial Commission, after the representatives of the company and men had failed to agree on a selection.

A change in the contract agreed upon names one of the federal judges of the Southern District of Ohio as the appointing power in case of disagreement over the selection of a third arbitrator in future disputes, instead of the State Industrial Commission.

The wage rate for the trainmen agreed upon by the members of the commission is as follows:

Interurban men: 44 cents an hour for the first three months; 46 cents, next nine months; 48 cents, thereafter.

Hamilton and Dayton city divisions: 41 cents an hour, first three months; 43 cents next nine months; 45 cents, thereafter.

Helpers on freight cars are to get 40 cents an hour.

Under the agreement existing before the new rate became effective, the maximum pay was 51 cents an hour. The large increase asked by the men was refused by the company, which offered as a counter proposal to continue the existing rate, under which interurban men received 51 and city men 50 cents an hour. The men refused this in turn and arbitration was agreed upon. The men would have gained had they accepted the company's counter proposal.

FIVE CITY SYSTEMS IN DAYTON

Dayton has five distinct city railway systems. In the case of the Dayton city system, whose employees are receiving a maximum of 62 cents under an arbitration award made on July 6, 1920, of which Mr. Hutchins was a member, this company has posted notices that effective on July 6 this year, the maximum will be reduced to 45 cents an hour.

One of the changes agreed upon by the arbiters in the Cincinnati & Dayton Traction Company dispute is that changing the status of men who have been discharged by the company. The old agreement forbade rehiring after discharge, but the new code reads that "such employees shall not be re-employed in a like capacity within a period of six months."

Power House Strike to Be Arbitrated

Pending arbitration the strike of stationary engineers employed at the power houses of the Cincinnati (Ohio) Traction Company is at an end. All the men who went out on May 30 have returned to work and all inclines with the exception of the Bellevue are again in operation. The Bellevue is closed down for repairs. Under the terms of the arbitration agreement the company and the union will select representatives and should they not be able to agree on the third member within ninety days he will be named by Superior Court Judge Robert S. Marx. The traction company has designated J. A. Brett, district manager of the Westinghouse Electric Company, as its arbitrator. Business Agent C. B. Manwood, of the union said the executive board of the organization would name its representative at once. The decision of the arbitration board will be retroactive to the time the men went to work. The engineers struck against a decision of the company to reduce their wages from 90 cents to 65 or 70 cents an hour. The men demanded the continuance of the old scale of 90 cents an hour.

Wage Reduction Under Consideration

The management of the Interborough Rapid Transit Company, New York, N. Y., has taken up in friendly discussion with the officers of the organization representing the men the matter of the revision of the present working agreement some time between now and its expiration. The hope is to reach a conclusion which in the light of the financial condition of the company will be to the best interest of the employees themselves as well as of the company.

The present agreement between the management and the men expires on Jan. 1 next.

The last increases in wages were made by the company in August, 1919, at which time wages were increased 25 per cent above the rates in the working agreement covering wages then in existance, and in June, 1920, when wages were increased 10 per cent above the rate in effect on Aug. 1, 1919.

The principle behind these adjustments of wages was the increasing cost of living, the company recognizing this high cost of living as a fact which had to be considered even in the face of an existing working agreement. In this connection the company explains:

> Beginning practically with the date of the last increase the reverse of this has been true, and the cost of living as shown by the same government statistics has been steadily declining for some time—a fact generally recognized and admitted.

Home Rule and Five-Cent Bills Lost

New Public Utilities Act Passed in Illinois, but Only After All Dangerous Features Were Eliminated

The so-called 5-cent fare bill fathered by Mayor Thompson of Chicago was voted down and thrown into the discard with the adjournment of the Illinois State Legislature on June 19. At the same session a new public utilities commission bill was approved which is supposed to hold out the hope of "home rule" over some of Chicago's utilities. The outcome on both these bills was a sore disappointment to Mayor Thompson and his followers and was preceded by bitter debates which stretched the session up to the legal time limit.

GOVERNOR SMALL was closely allied with the Chicago political element and used every effort to save both measures. After adjournment he issued a statement expressing his disappointment and announcing that he would call a special session so that the legislators might have time to reconsider. There was comment to the effect that Mayor Thompson would use his influence with the present commission to bring about a reduction at once in the 8-cent fare of the Chicago Surface Lines.

Commission Name Changed

If Governor Small approves the new utilities act the commission will be known hereafter as the Illinois Commerce Commission. Its membership will be increased from five to seven members and seven assistant commissioners. Another change in the present law will allow appeals to the Circuit Court of the local county instead of to the Circuit Court of Sangamon County only. The bill was stripped of the clause giving city councils power to initiate a referendum for home rule. This can only be attained by a petition signed by 25 per cent of the registered voters in a community. The Legislature also wiped out the section which would prevent the commission from setting aside contracts between municipalities and utility corporations.

An attempt was made to strike out the whole home rule section of the bill. This failed, but the measure was amended to provide that if home rule is established in any community rulings may be appealed to the state commission and from that body to the local Circuit Court and thence to the Supreme Court. Inasmuch as home rule can be established only over utilities entirely within the city limits, this is said to eliminate all except the surface lines and the gas company in Chicago. It is contended that the bill in its present shape is not more drastic than the existing measure.

Mayor Thompson Fought the Fight

The fight on Mayor Thompson's 5-cent fare bill was one of the features of the closing days of the Legislature. This bill provided that surface and elevated lines might be acquired, with the approval of the people, through the creation of a "transportation district"; that operation of the lines would be conducted by nine trustees; and that the "district" would have authority to issue bonds for purchase of the railway properties. The Mayor suffered his most serious defeat when the 5-cent clause was stricken out. It was intended that any deficit to meet costs would be made up by general taxation. Mayor Thompson went to Springfield to urge passage of his bills and he admitted that he would favor 4-cent, 2-cent and even 1-cent fares if the people voted for such rates. He even was quoted as saying that he would favor free street car service if the people voted for it. This roused some of the Senators to much stronger opposition.

As finally amended the bill allowed the board of trustees to determine the rates of fare and charges upon transportation systems and a referendum would be required on all bond issues. It was also provided that no community would be combined with a "transportation district" without consent of its voters. With all these amendments taking the political attractions from the bill the measure was lost by a close vote in the closing hour of the legislative session.

Railway to Run Buses

Connecticut Company Announced Plan at Bridgeport Hearing Before Public Utilities Commission

Under the recent authority granted by the State Legislature the Connecticut Company proposes to establish five motor bus routes, three in Bridgeport. This announcement was made at a hearing before the State Public Utilities Commission held at Bridgeport June 21-22, on applications for certificates of public convenience and necessity to operate motor buses in Bridgeport and vicinity after July 15 when all motor bus lines come under the jurisdiction of the Commission.

The Connecticut Company, President Storrs said, was prepared to undertake a bus service complementary to that of the electric railway with a free interchange of transfers within the city area between the buses and trolley cars.

The city of Bridgeport petitioned for the authorization of thirteen routes some of which competed with the trolley. Under the city's plan the number of buses in operation would be cut from 200 to 88. More than 500 sought permits to operate these routes, modification of which was asked in some cases. One application from the American Transit Company, a recently formed stock corporation, sought the right to operate all routes as laid out. It was brought out that the city was probably 50-50 for trolleys and jitneys and would resent the loss of either.

Percy T. Litchfield, head of the city's traffic commission, represented the local Chamber of Commerce. He declared that a limited bus system was necessary in addition to the trolley service and that if the railway would meet the needs for bus lines on some routes no other permits should be given. The chamber wanted to see the trolley system get on its feet and be alive to modern conditions. In short, transportation by motor vehicle has come to stay no matter what fare may be required to support the service. If the officers of the railway took advantage of the rights they now have to operate supplemental bus service, it would be possible for them to handle the situation, but with their trolley cars alone they cannot do it since the people have experienced the advantages of the jitney service.

The company in its testimony brought out that in 1920 for the Bridgeport division operation expenses and taxes exceeded revenues by $470,000.

No allowance is made for depreciation. In the Commission's own valuation for this division of $8,000,000, based on 1910-1914 prices or of $14,400,000 on 1919 prices an 8 per cent return would bring the losses up to more than a million dollars, exclusive of any allowance for depreciation. For the first four months of 1921 with service materially curtailed and the closest watch over expenditures and every possible economy, the operating expenses and taxes still exceeded the revenues by $17,818.

For Labor Unions: A Receipt for Immortality

An editorial with this title from *America at Work*, a publication issued in St. Louis, has been reprinted in pamphlet form by Ivy L. Lee. The editorial declares that the labor union should not place so much emphasis on the possession or non-possession of a union card, but should declare its interest in "good working conditions, good wages and the highest possible standard of craftsmanship." It says that all "closed" shop organizations are despotisms, whether they are a church, university, school of medicine or labor union, and that union labor should go as far as modern churches, schools, physicians and insurance companies in placing emphasis on the end and not the means, on the aims of the organization and not on membership in the organization itself.

The pamphlet also says that mere display of power will not insure immortality. Modern men do not back down before power as such at all. They only yield respect to the foundation of power, and power in a democracy can have no permanent foundation except in service.

Byllesby Property Slightly Damaged

According to a recent statement the Arkansas Valley Railway, Light & Power Company, a Byllesby property, suffered only slight damages in the Pueblo cloudburst and flood. R. G. Hunt, assistant to the vice-president of the Byllesby Engineering & Management Corporation, was one of the first outsiders to reach the scene of the disaster. He said in part:

> Our street railway during the early hours of the flood continued in service, carrying the panic stricken out of the flood district. The cars operated until it was no longer possible to operate the power plant. There were many notable instances of individual bravery. Construction Superintendent Phythian, who stuck to the power house to the last, was marooned on top of the new steel structure all night. Early next morning when the waters had subsided he attempted to wade out, and was caught in the swirl of water. After a hard battle for his life he was drawn to safety by means of a rope thrown to him.

Stockholders of the company have been assured of their investments by means of a circular letter sent out on June 14, after the property loss had been ascertained. The management states that the Pueblo plant will be in full operation in two weeks.

Evidence Piling Up Favorable to Hydro-Electric Project

Bion J. Arnold's report received further consideration from the Ontario Hydro Radial Railway Commission during the week ended May 14. Frank A. Sager, managing engineer for Mr. Arnold, gave evidence in the absence of the latter from the city.

The Toronto Suburban system, as projected, will consist of the existing lines of the Toronto Suburban Railway operating from Keele Street to Guelph, to Woodbridge and to Weston, as well as the present Davenport, Crescent and Lambton lines. Mr. Arnold suggested that the Guelph division be changed and the cars operated right into the downtown terminal in Toronto, in 1925, by constructing then a connection from Lambton to the Toronto-St. Catharines Radial at Swansea via the old belt-line route.

The traffic counts made in Toronto showed that of the total traffic carried by the street car lines in that section 48 per cent was rush-hour traffic carried in the three busy hours of the day; 6 a.m. to 8 a.m. and 5 p.m. to 6 p.m. The other 52 per cent was distributed over the remaining sixteen hours of the operating day. This showed that Toronto probably had a higher traffic peak than any other city in North America. The practice of selling eight tickets for 25 cents for rush-hour riding was wrong from a financial point.

With respect to the interurban service of the Toronto & Eastern, which it was proposed should be operated to Bowmanville, 40 miles, it was shown that the riding habit of the population in that territory would mean 1,640 passengers per day into the Toronto terminal. This estimate did not include the actual count of passengers riding between stations along the route.

Dealing with operating expenses of the whole system of hydro-radials, Mr. Sager submitted figures of fourteen radial lines in the United States showing a range of 60½ down to 32.4 cents per car mile. The hydro-radial figures for the five divisions were 28.7 cents. This difference was accounted for by the fact that the hydro system as proposed was the only one on the American continent having 300 miles of lines that embraced rapid transit, interurban, express and heavy freight services.

The Guelph Radial Railway system has been transferred to the Hydro Commission in accordance with the Order-in-Council recently passed by the Ontario Government. Manager House will be retained as the operating head by the commission.

News Notes

Little Rock Men Win.—Union employees of the Little Rock Railway & Electric Company, Little Rock, Ark., won their wage controversy from the company in an award handed down by the board of arbitrators on June 10. The vote was unanimous against a decrease in the men's present scale of from 46 to 51 cents. The award will serve as a one-year contract.

$1,000,000 Electrification Project.—The Electric Short Line, Minneapolis to Hutchinson, Minn., is to be extended 25 miles and electrified. The estimated cost of the project is $1,000,000. Work is expected to begin by July 1. The overhead trolley will replace the gas-electric and oil-burning locomotive. E. D. Luce, president of the company, is a member of the executive committee of the American Short Line Railway Association.

Five Cents an Hour Wage Cut.—Motormen on the lines of the Sault Ste. Marie (Mich.) Traction Company were recently informed of a wage cut of 5 cents an hour. The reduction became effective on June 1. The wage was 48 cents an hour. Manager Taylor announced that this action on the part of the company was necessary and that the recent increase in fares had not materially affected the financial condition of the company.

Trackless Trolley Under Consideration.—The trackless trolley is being considered for adoption in Grand Rapids, Mich., as a solution for the present need of extensions to existing lines of the Grand Rapids Railway. Officials of the railway do not believe that the proposed innovation will be feasible for thoroughfares which carry heavy traffic, but it is thought that many residence streets in outlying portions of the city where extensions are needed might prove ideal for the operation of such lines.

Wage Cut Rejected.—The employees of the Atlantic City & Shore Fast Line Railroad, Atlantic City, N. J., have refused to accept a proposition made to them by the management that the men take a voluntary 10 per cent reduction in wages to assist in the effort to get back to normal living conditions.

Wage Offer Rejected.—The trolley men of the State have rejected the wage offer of the Connecticut Company, which fixed a minimum of 49 cents for the beginner and a maximum of 54 cents an hour for the old-timer. It is said that by a four to one vote the local conductors and motormen at New Haven rejected the offer, which is the second one and about a nickel an hour better than the first offer, which also was rejected by a referendum vote of the men. It is believed that the matter will go to arbitration.

Wages Cut in Dayton.—It is expected that all railway properties in Dayton, Ohio, will unite in a uniform wage reduction. Managements of the Oakwood Street Railway, the Dayton, Springfield & Xenia Southern Railway and Dayton Street Railway have announced a wage cut of practically 17 cents an hour. The new scale will be 41 cents for the first three months, 43 for the next nine months and 45 cents for all over twelve months' service. The present scale is 58, 60 and 62 cents an hour. The cut is scheduled for July 6.

Wages Increased in Worcester.—An increase in wages of 3 cents an hour for trainmen went into effect on June 1 on the lines of the Worcester (Mass.) Consolidated Street Railway under a contract that terminates on Dec 31. It is said that the added expense to the company until the end of the year will be $80,000. The new wage scale will give employees for the first three months' service with the Consolidated 58 cents an hour; for the next nine months, 63 cents an hour, and after the full year's service the men will receive 68 cents an hour.

London Workshop Cost Underestimated.—In a previous item in the ELECTRIC RAILWAY JOURNAL on the erection of workshops by the London underground electric railway companies and the London General Omnibus Company the cost of the project and the area covered were inaccurately stated. The railway shops will cover an area of 28½ acres and will cost approximately £450,000 inclusive of price of land, cost of buildings and equipment. The omnibus depot will cover 30 acres and will cost approximately £500,000 inclusive of the land, buildings and equipment.

Franchises Surrendered in Indiana.—Local franchises in six cities—South Bend, Mishawaka, Elkhart, Goshen, Laporte and Michigan City—have been surrendered by the Chicago, South Bend & Northern Indiana Railway, which made application recently to the Indiana Public Service Commission to operate under indeterminate permits. This is the second large corporation outside of Indianapolis to accept indeterminate permits granted under the act which established the public service commission and abolished the railroad commission.

Men Accept Wage Cut.—Officials of the Southern Indiana Gas & Electric Company, Evansville, Ind., recently signed an agreement with the union for one year, calling for a reduction in wages amounting to 18 per cent. The men working on the city cars under the new agreement will receive from 36 to 43 cents an hour; the men on the interurban cars from 38 to 43 cents an hour and the men on the one-man cars will get from 40 to 45 cents an hour.

To Pull Together for Mutual Benefit.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., has recently created a Department of Personnel "for the systematic supervision, study and improvement of the human element in organization." The new department will have as its watchwords, justice, co-operation and economy. In taking a personal interest in every employee the Committee on Personnel will know what employee should be transferred to other departments, who should be advanced, etc. The training of platform men will be one of the duties when space and equipment are available.

"Electric Railway Service" Suspends.—The Detroit (Mich.) United Railway has suspended publication of *Electric Railway Service*, established in June, 1913, and the forerunner of many similar publications issued at this time. Economies are necessary and the company being opposed to carrying advertising in the publication, "it is quite necessary that suspension follow when the revenues are not sufficient to meet expenditures." In conclusion this opinion is expressed: "We feel sure that thousands of our friends and patrons will rejoice when conditions change and a renewal of publication becomes possible."

Federal Commission to Study Waste.—A federal commission to study waste elimination in industry is proposed in a bill which has been introduced by Senator Calder. The bill is intended to continue and to amplify the survey made by the Federal Engineering Societies at the instigation of Herbert Hoover, who at that time was president of the organization. The commission is to be composed of seven commissioners to be appointed by the President, and the Secretary of Commerce is to be chairman of the commission. The final report is to be made on or before Sept. 21, 1922. The report is to cover waste in "timber, power, transportation, oil, coal, essential minerals and other basic raw materials." The commissioners are to serve without salary.

No Plans Formulated by Commission.—F. H. La Guardia, president of the Board of Aldermen, New York, N. Y., recently issued a statement in which he charged that "all promises of new lines and new extensions made when the new transit law was under discussion were empty promises not capable of being kept." This statement was made as a result of the failure of Mr. La Guardia to exact a pledge from George McAneny, chairman of the new transit commission, that a 5-cent rate of fare would be retained on the rapid transit lines. This promise would have been reciprocated by the Board of Estimate appropriating funds for the commission. Mr. McAneny's letter to Mr. La Guardia stated that no conclusion had been reached in relation to the commission's plan.

Wages Remain the Same.—A wage settlement for the year ending May 31, 1922, has recently been effected directly between the Asheville Power & Light Company, Asheville, N. C., and its trainmen on the basis of the present scale running from 48 to 56 cents an hour. The agreement is subject to termination upon the giving of sixty days' notice by either party. The arbitration board appointed about a year ago to determine upon a scale of wages to be paid the trainmen of the company, for the year ended May 31, 1921, fixed a wage scale of 48 cents an hour for the first six months, 49 for the second six months, 50 for the third six months, and 56 cents an hour thereafter. This year the trainmen submitted to the company an agreement calling for a wage scale running from 54 to 60 cents an hour.

$500,000 to Aid Industry.—With the passage of the second deficiency bill by the Senate, the Department of Commerce is certain to receive the $500,000 asked by Secretary Hoover for the specific purpose of aiding industry. Of the amount, $250,000 will be expended in an effort to encourage foreign trade. The remainder will be utilized in various types of investigation and research looking to simplification, standardization and improvement in industrial practices and devices. The detailed plans for expending this money in the most effective way possible now are being worked out. As this is written, the bill still is in conference, but no great amount of difficulty is anticipated in harmonizing the differences between the bill as passed by the House and as it finally emerged from the Senate. That the President will sign the bill is a foregone conclusion.

New Franchise Urged in Houston.—Luke C. Bradley, vice-president and general manager of the Houston (Tex.) Electric Company, has notified Mayor Oscar F. Holcombe and members of the City Council that his company is ready to open negotiations with the City Council looking to the granting of a new railway franchise. The company has been operating under a temporary arrangement since it won its fight in Federal court for an increased fare. Negotiations opened several times since the company's victory in court have resulted in a deadlock each time, and the company has continued to operate under the court's order. Mayor Holcombe and members of the City Council have declared that any new franchise must include the expenditure of large sums for improvements, extensions and betterments. The fate of the jitneys in Houston also is a point that will be settled in the franchise negotiations.

Public Service Men Accept Cut.—The trainmen on the Public Service Railway of New Jersey, Newark, have voted to accept a reduction in wages of approximately 10 per cent. The new scale will be 46, 48 and 50 cents an hour, with 5 cents additional to operators of one-man cars. This is the scale fixed by the War Labor Board in 1919. The present rates are 50, 53 and 55 cents an hour. The company wanted to revert to the rates of 41, 43 and 45 cents an hour. A two-year agreement containing this scale was signed on June 22 by the joint conference board of the company and of the Amalgamated Association. The men had previously refused to accept a proposed reduction of 20 per cent. The new scale will go into effect on Aug. 1. Every employee of the company now a member of the Amalgamated Association will be bound by the terms of the new contract. New men will be taken on irrespective of any union affiliations.

Fate of Railway in Hands of City.—Unless the taxpayers of Brunswick, Ga., are in favor of buying the City & Suburban Street Railway, which operates in that city, and maintaining it as a going concern the threatened junking of the line will take place. The bondholders foreclosed their mortgage on the property recently. At a conference on May 11 between the Board of City Commissioners and representatives of the Board of Trade a proposal was made by the company that the lines be purchased and operated by the city government. In its statement the company suggests an extension of the line to Arco and expresses the belief that such extension would put the line on a paying basis if properly managed and operated. The property includes 8½ miles of track with the necessary wire, poles, etc., five motor cars and six trailers. It is believed that a questionnaire will be submitted to the voters in regard to the purchase of the line by the city government.

Programs of Meetings

Amalgamated Association of Street & Electric Railway Employees

The seventeenth convention of the Amalgamated Association of Street & Electric Railway Employees of America will be held on Sept. 12 at Auditorium-Armory, Atlanta, Ga. The headquarters will be at the Ansley Hotel.

Society for the Promotion of Engineering Education

The Twenty-Ninth Annual Meeting of the Society for the Promotion of Engineering Education will be held at Yale University June 28-July 1, 1921. The meetings will be held in college buildings, at the Lawn Club and at the Country Club.

Financial and Corporate

Wheeling Roads Sold

Controlling Interest in City Railway and Affiliated Lines Secured by Providence Bankers

Sartorius & Company, Providence, R. I., have purchased a controlling interest in the West Virginia Utilities Company, which controls the Wheeling Public Service Company and the City Railway. The management of these properties has for some time been under the direction of the W. S. Barstow Management Corporation, which has been represented locally by J. D. Whittemore. At a recent meeting of the board of directors it was determined to continue the present management for the time being. The directors instructed Mr. Whittemore to co-operate in every way with M. R. Stern, the engineer representing Sartorius & Company.

Mr. Stern is now manager for Sartorius & Company at Chattanooga, Tenn., for the Public Light & Power Company. He expects to divide his time between Wheeling and Morgantown. In commenting on the situation in Wheeling Mr. Stern said:

> The situation in Wheeling presents a number of perplexing problems. I can't say now, off hand, what will finally be done in respect to some of these difficulties, but the new owners of the Wheeling properties are going to do everything in their power to keep these roads going. The competition of the bus lines makes the difficulties of the railways greater.
>
> It would be very unfortunate, indeed, for the residents of that fine section Out-the-Pike and on through your fine valley to West Alexander if it should become impossible to operate the road longer.

According to Mr. Stern the new owners of these roads would like to see the properties held intact, but with the problems confronting the roads, their future is rather uncertain. The proposal to abandon operation of the City Railway will be dropped for the present, although the change in ownership does not necessarily change the status of that problem. Mr. Stern said further that as regards Wheeling, no change in the rates of fare or in the operation methods is contemplated.

Large Budget for M. O. Construction

According to the Detroit *Free Press* $1,000,000 will be added this year to the upkeep of the Department of Public Works for the construction of the municipal railway in Detroit. This is another example of expenditure not charged to the railway property on account of municipal operation. In various sections of the city repaving and resurfacing have been undertaken in this construction. To meet the cost of this resurfacing Mayor Couzens requested the Council to add another $1,000,000 to the budget. No part of the money will be taken from the $15,000,000 voted by the people for a municipal railway system. The *Free Press* says:

> The department of public works is not the only department of the city which was forced to add to its budget in order to shoulder part of the expense of the municipal operation system. The public lighting department, the water board and the forestry department have all been called upon to make large expenditures in order that work on municipally operated lines should not all be charged against the $15,000,000 appropriation.

The commission and the Mayor have announced that the new lines are being constructed more cheaply than railway lines ever were constructed in any other American city. The actual cost to the street railway commission is about $62,000 per mile, according to Ross Schram, the secretary.

Municipal Railway Bonds Taken

A new syndicate, composed of the Guaranty Company, the National City Company, Bankers' Trust Company, Harris, Forbes & Company, Eastman, Dillon & Company, E. H. Rollins & Sons, all of New York, and Keane, Higbie & Company and the Detroit Trust Company, of Detroit, has purchased of the city of Detroit $2,000,000 bonds; $1,000,000 of 5½s, due May, 1949, and $1,000,000 of 6s, due June, 1947. The syndicate has also taken over the small remaining balance of bonds in the previous syndicate and is offering the 6 per cent bonds, maturing in various amounts from 1927 to 1951, on a 5.60 basis, and the 5½ per cent bonds, maturing from 1931 to 1948, at par.

The $2,000,000 city of Detroit 5½s and 6s are issued by the city for street railway purposes, and are the bonds recently validated by the Supreme Court of the State of Michigan. The decision of the court handed down on June 6 referred to a similar suit in the Federal courts, in which, upon appeal, the Supreme Court of the United States held that the proceedings to authorize the municipal railway to issue bonds were regularly taken. The Michigan Supreme Court also went on to uphold the validity of the special election held by the city on April 5, 1920, at which the voters by a very decided majority authorized the bond issue and municipal street railway program, and upheld the power of the city to issue the bonds, assume the obligation and to "convert money raised by taxation to the construction of its street railway system."

The bankers explain that this action of the court effectually disposes of any question as to the validity of the bonds and establishes their investment position.

Dividends Paid in Scrip

Holding Company with Large Oil Interests Conserving Its Resources —Shares Sell Down

Dividends of the Cities Service Company, New York, N. Y., are for the present to be paid in scrip instead of cash. This decision was made by the directors on June 15. No maturity date has been set for the scrip. Moreover, the scrip does not bear interest. In case of stockholders forced to sell their scrip, it is said that Henry L. Doherty, fiscal agents for the Cities Service Company, have planned a syndicate to take over the scrip at the market. The company has outstanding with the public more than $77,000,000 of cumulative preferred stock, more than $3,000,000 of ordinary preferred stock and $45,000,000 of common stock. In addition there are close to $30,000,000 of debentures outstanding.

MOST EARNINGS FROM OIL

While the company controls electric and railway properties, its principal source of income is derived from its oil holdings and leases. The gross earnings for 1920 were $118,000,000, the net after preferred dividends were paid being more than $18,000,000.

A statement by the Cities Service Company to stockholders gives at length the memorandum submitted by H. L. Doherty, president of the company, to the directors. He said that his recommendation for the suspension of the dividends had been reached after numerous conferences with the most notable oil men. Nearly all agreed that the present excessive production of oil over the demand could not last long, and that a period of shortage was in prospect. He said that by the decisive action at this time in suspending the dividends the directors would be able greatly to increase the value of the company's assets, resume cash and stock dividends at an early date, with the payment of all scrip issued for dividends, and be able again "to reward our stockholders in a handsome way for having accepted a change from our present dividend policy to one wherein we will issue only scrip."

The effect of this action on the stock was greatly to depress all the various issues, although they necessarily suffered in the general decline which has recently been in evidence. Cities Service common has sold down to about 130 from a high of 259 last year.

Commission Approves Sale.—The Public Utility Commission of New Jersey has approved the application of the Five-Mile Beach Electric Railway, Wildwood, N. J., for the sale of a plot of land in Wildwood, N. J., for a consideration of $7,500. Approval was also granted for the abandonment of tracks on what is known as the loop at Wildwood Crest. Need for the loop has disappeared since the introduction of double tracking, it was testified.

Answers to Accounting Questions

Another Series of Questions and Tentative Answers Under the Uniform System of Accounts for Electric Railways

Another series of tentative answers to questions raised in connection with the uniform system of accounts, prescribed by the Interstate Commerce Commission, has just been issued. As these answers have not received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

THE case numbers covered below are from A-602, b to A-614, with certain omissions. Another installment will follow. The omitted numbers represent cases which either are not of sufficient importance to justify publication or involve questions upon which a definite conclusion has not been reached.

Q. (*A*-602, b). What is the correct accounting for the cost and maintenance of smokestacks erected at power houses?

A. The cost of smokestacks which are not permanent as to position but are attached to and are part of the boilers shall be charged to account 542, "Power plant equipment." If they are permanent in position and will remain as part of the building structure in case the other equipment is removed, account 539, "Power plant buildings," shall be debited. Maintenance shall in each case be charged accordingly.

Q. (*A*-603). Paving assessments are paid in installments, each payment covering one installment and the interest due on the deferred payment. What is the proper accounting?

A. If the cost of property assessed is carried in account 401, "Road and equipment," the proportion representing the principal of the assessment shall be debited to account 511, "Paving," or to account 10, "Paving," depending on whether the assessment is for installation of new paving or the improvement of old paving, or for pavement maintenance. If the cost of the property assessed is carried in account 404, "Miscellaneous physical property," the proportion representing the principal of the assessment, if for new paving, or the improvement of old paving, shall be debited to account 404, and if for pavement maintenance, to an account includible under accounts 205, "Net income from miscellaneous physical property," or 219, "Net loss on miscellaneous physical property," as may be appropriate. The proportion of each payment which represents interest shall be charged to account 221, "Interest on unfunded debt." (See Case 267, Accounting Billetin 14.)

Q. (*A*-604). To what account should be charged the pay of employees engaged in directing or overseeing "safety-first" and "prevention of accidents" work?

A. The pay of such employees shall be charged to accounts 1, "Superintendence of way and structures," 29, "Superintendence of equipment," 45, "Superintendence of power," or 63, "Superintendence of transportation," depending on the class of work upon which they are principally engaged, except that the pay of employees or others engaged exclusively in the general promotion of "safety-first" methods among the public shall be charged to account 89, "Miscellaneous general expenses."

Q. (*A*-605). To what account should be charged the cost of loading, hauling, and unloading steam locomotive cinders accumulated at cinder pits and other places near shops?

A. The cost of loading shall be charged to account 75, "Operation of steam locomotives." The cost of hauling and unloading shall be charged to the appropriate maintenance, road or other account depending on the use made of them. If cinders are not used for any purpose the entire cost of removal shall be charged to account 75. (See Cases 166 and 289, Accounting Bulletin 14.)

Q. (*A*-606). To what account should be charged:

(a) The pay of cashiers at elevated and subway stations.

(b) The pay of chief cashier and assistants engaged in supervising the station cashiers.

A. (a) Pay of station cashiers is chargeable to account 68, "Station employees."

(b) Pay of chief cashier, if he is considered a general officer, is chargeable to account 83, "Salaries and expenses of general officers." If chief cashier is employed in the general office but is not considered a general officer, his pay is chargeable to account 84, "Salaries and expenses of general office clerks," as is also the pay of his clerical assistants.

Q. (*A*-607). What account should be charged with the cost of rebuilding a work car wrecked while it was being used for converting a trestle to an embankment?

A. If the wreck was directly attributed to work the cost of which is chargeable to account 504, "Grading," car repair costs shall be assigned to the same account, but if attributable to work chargeable as maintenance or was caused by transportation operations, repairs shall be charged to account 32, "Service equipment."

Q. (*A*-608). A carrier pays a power company a fixed rate per kilowatt hour for power used, and, in addition, a percentage of the cost of a transmission line built and maintained by the power company to serve the carrier. How should the payments be charged?

A. Assuming that the ownership of the transmission line remains with the power company, the entire amount paid by the carrier shall be debited to account 59, "Power purchased."

Q. (*A*-610). A carrier installs a spur track in a street not previously occupied by tracks. How should it account for the cost of removing pavement preliminary to track construction, and the cost of replacing pavement after track construction?

A. The cost of removing paving shall be charged to account 504, "Grading," and the cost of the new paving to account 511, "Paving."

Q. (*A*-611) When a carrier sets up a depreciation reserve on way and structures, should it base its depreciation charges solely on the amounts in accounts representing specific property, such as account 506, "Ties," and 511, "Paving," or on amounts in all accounts for way and structures?

A. As the charges to operating expenses should represent the actual current loss from depreciation, they shall be based on the accounts which include depreciable property. It is required that the records shall be such that the depreciation accrued with respect to any particular unit of property may be readily determined and cleared from the reserve at the time such unit is withdrawn from service.

Q. (*A*-612) A carrier receives rental from property used by another carrier, the payment covering factors of rent, maintenance, and operation. Should the entire amount be credited to revenue account 115, "Rent of tracks and facilities," in accordance with the text of that account, or should that portion representing the cost of maintenance and operation be credited to primany operating expense accounts as indicated in Cases 332 and 403 of Accounting Bulletin 14?

A. Where the payment is for rent of tracks, terminals, or bridges which are jointly used the full amount shall be credited to the appropriate rent accourt regardless of the basis used in determining the amount of the payment, but where the payment covers only a proportion of the cost of maintenance and operation of property which is jointly used and there is no element of rent involved, the amount shall be credited to the appropriate primary maintenance and transportation expense accounts.

Q. (*A*-613) To what account should be charged cost of publishing notices of fare increases, such publications being prescribed by city ordinance?

A. To account 80, "Advertising."

Q. (*A*-614) A carrier has established a department, under the care of a superintendent, for the operation of non-revenue equipment. How should the department expense be distributed?

A. The pay and traveling expenses of the superintendent shall be charged to account 83, "Salaries and expenses of general officers," and the other general expenses to account 84, "Salaries and expenses of general office clerks," 85, "General office supplies and expenses," and to account 94, "Stationery and printing," as may be appropriate.

Belgian Light Railways Being Rehabilitated

The report of the National Light Railway of Belgium (Société Nationale des Chemins de Fer Vicinaux) shows that the destruction of track caused during the German invasion is rapidly being repaired. During the past year 647 km. of track which had been demolished was again made ready for service and on Dec. 31, 1920, 3,388 km. was in operation. About 600 km. of track remained to be rehabilitated. During 1920 the company purchased 71,000 (metric) tons of rails and 1,897,645 ties. The Germans took from the property 427 steam locomotives, 14 electric motor cars, and 116 electric trail cars, but the greater part of this material has been recovered. The motive power used is both steam and electric, divided as follows:

Steam power on	3,852.11 km.
Electric power on	359.29 km.
Mixed service of steam and electric	84.45 km.
Total of lines opened for public service	4,295.85 km.

The extent of track on which electric cars are used, measured in miles, is 225. The service given throughout the system is a light railway service and some city tramway lines are included in the system. Altogether in its electrical equipment the company has 568 electric motor cars, nine gasoline-electric motor cars, 286 closed electric trailers, and 246 open electric trailers. At the end of the year sixty-nine electric motor cars were under order. The receipts during 1920 from all sources were Fr. 66,934,551, and the expenses Fr. 65,246,002.

Change Suggested in Mexican Financial Plans

A report of the London committee on the financial situation of Mexican Light & Power and the Mexican Tramways group of companies announces an issue of $12,000,000 of 6 per cent debentures.

No interest has been paid on the various issues of bonds and on funded debts for over six years, and the aggregate of funds now available falls far short of the amount required to discharge the interest, quite apart from the principal of the unfunded debts, which are long overdue. The aggregate debt of the associated companies, as at the end of December last, was more than $8,897,000. No dividend has been paid since November, 1913, on the $6,000,000 of preference shares of the Light & Power company. The report says that the default of the associated companies is a direct consequence of the conditions prevailing in Mexico since 1911.

An outline of the provisional agreement gives in considerable detail plans for payment of a number of coupons forthwith, further payments by the end of June, 1922, and others a year later, but sinking fund payments to be resumed in 1928 with all payments to that date to be waived. Bondholders are urged to accept the proposed plans as "being the best arrangement that can be effected in their interests."

The report says that although the position in Mexico remains difficult, the outlook is certainly more hopeful than it was.

Interurban Dissolution Petition Presented

A petition for the dissolution of the Ohio Electric Railway system was filed in the Federal Court at Toledo, Ohio, during the week ended June 18 by Receiver B. J. Jones, Columbus, who asks permission to surrender the leases of several of the subsidiary lines in the system.

The receiver alleges in the petition that the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Traction Company, and the Fort Wayne, Van Wert & Lima Traction Company, do not collect enough revenue now to pay the rental required of the Ohio Electric Railway.

The Ohio Electric wants allowance in stock for the cars used on these lines which it has purchased during its operation of the lines.

Mr. Jones says he believes he can make the Ohio Electric itself pay its way if it is released from the burdens of the other lines.

Judge John M. Killits has not made an order in the case.

Financial News Notes

Georgia Property to Be Sold.—The property and equipment of the City & Suburban Railway, Brunswick, Ga., will be sold on July 5 as a going concern. If a satisfactory bid is not received it is likely that the property will be sold as junk.

Traffic Decreases in Cincinnati.—Higher fares and industrial conditions in general have greatly affected the traffic handled by the Cincinnati (Ohio) Traction Company. During the month of May, 1921, there was a daily decrease of 39,963 passengers compared with May a year ago. The total decrease in revenue passengers for the month was 1,238,900.

Wants to Abandon Service.—The Union Railway, New York, N. Y., has applied to the Transit Commission for permission to abandon service on Jerome Avenue, Bronx. S. W. Huff, president of the company, said in the petition that the receipts of the property do not warrant continued operation; that the opening of the elevated part of the Lexington Avenue rapid transit line on Jerome Avenue had taken most of the traffic in that direction. A public hearing on the abandonment will be held on July 21.

$10,000,000 for Purchase and Improvements.—Civic Finance Commissioner Ross of Toronto, Ont., has been authorized by a by-law passed by the City Council to issue debentures for $10,000,000. The Transportation Commission, which is preparing for the city to take over the Toronto Railway on Sept. 1, asked for $7,000,000 and part of the balance of the $10,000,000 will be used in the rehabilitation and operation of the system. In asking the Council for this amount, Commissioner Ross said he proposed to cancel some $2,026,000 of the issue authorized last February.

More Eastern Massachusetts Lines to Stop.—The Mayor of Woburn, Mass., and the Selectmen of Burlington and Billerica were notified on June 4 by Homer Loring, chairman of the trustees of the Eastern Massachusetts Street Railway, that the Woburn-Billerica line would be posted on June 6, for discontinuance, to be effective on and after June 13. The company says it is compelled to take this action because of the failure of those three communities to take the necessary steps to eliminate jitney competition. The proposed change will cut off all connection between Woburn and Lowell and intermediate places.

Stockholders Not Liable. — Stockholders of the Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, are not liable to assessment in the suit by Dwight S. Marfield, according to an opinion handed down by Judge Stanley C. Roettinger in the Hamilton County Common Pleas Court, Cincinnati. The suit sought to hold all stockholders of the company and named more defendants than any other action ever filed in the local courts. That there was no contractual relation that would put this case within the provisions of the Federal constitution, Judge Roettinger said was the basis of his decision. Dwight Marfield, representing creditors of the company, sought in the suit to make former stockholders liable for $500,000 of debts.

Defers Dividend Payment. — The board of directors of the Indianapolis (Ind.) Street Railway at a recent meeting voted to defer the payment of the usual quarterly dividend on the preferred stock of the company, due on June 1. Dr. Henry Jameson, president of the board, explained that the directors felt that "the condition of the company is such that payment of this dividend should be passed." The dividend due on June 1 was 1½ per cent on $5,000,000 of preferred stock, totaling $75,000. This is the first time the company has passed a dividend on this stock, Dr. Jameson said. Payment of dividends on certain stock of the company was waived in the reorganization of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company on the order of the Public Service Commission in 1919.

Traffic and Transportation

Ottumwa Case Unusual

Two Years of Litigation Over the Matter of Fares Leaves Railway Where It Started

The net result of the litigation between the Ottumwa Railway & Light Company, Ottumwa, Iowa, and the city over the matter of fares is that the company finds itself under the recent decision of the Supreme Court of Iowa about where it started a little more than two years ago. This decision was referred to in the ELECTRIC RAILWAY JOURNAL for April 16, page 751.

The following summary is from a statement prepared by Cummins, Roemer & Flynn, attorneys, Chicago.

By a provision in its franchise the Ottumwa Railway & Light Company was limited to a maximum rate of 5 cents for street railway fares. In December, 1918, the City Council passed a resolution authorizing the increase of the fare until after the signing of the treaty of peace with Germany, the new rate to be 6 cents. This rate was put into effect, but about April 1, 1919, the City Council rescinded the resolution and attempted to prohibit the company from charging more than 5 cents.

Thereupon suit was brought. A temporary injunction was granted by the trial court which upon motion of the city was dissolved. From the order dissolving the temporary injunction the company appealed to the Supreme Court, where the question discussed was the validity of the franchise limitation of fare in the first instance, it being the contention of the company that the Legislature had never delegated to the city the state function of fixing rates and that therefore the franchise contract limiting the fare to 5 cents was void for want of power in the city to make it. The Supreme Court of Iowa held against this contention in an opinion dated July 10, 1919.

Following this ruling the company filed a petition for a rehearing. This rehearing was granted. After reargument and resubmission of the case a second opinion was handed down on Aug. 9, 1920, in which the contention of the company was upheld that the city was without authority under the statute to make a rate by contract with the railway and that the contract in that regard was void.

Both opinions upheld the broad principle that a city could not contract for rates of a public utility unless its authority so to do had been expressly conferred by the State Legislature, the fixing of rates being a matter of state control, but in the former opinion by a unique theory the judge who wrote the opinion read into the statute the authority demanded by the general principle laid down. In doing this he overlooked a governing decision by the court and hence the same judge wrote the second opinion above referred to.

When the second opinion was handed down the company naturally concluded that the litigation was ended. The city, however, through its counsel filed a petition for rehearing. This rehearing was granted by the court and the case was set down for argument the third time in April, 1921. In the meantime the personnel of the Iowa court had changed considerably as a result of the election in the fall and the death of one of its members. Before the time came for submission the company asked leave to dismiss the appeal. This was granted by the court with a memorandum to the effect that both the opinions rendered in the case and above referred to were withdrawn.

With a view to determining what would be the proper fare since the reduction in wages, a statement has been prepared by accountants for the city which shows that from June 9, 1920, to March 31, 1921, 28 per cent of rendered in the case were withdrawn.

Omaha Company Wants Skip Stops Continued

The "skip-stop" system, which has been used at Omaha, Neb., since Oct. 1, 1918, was defended before the State Railway Commission in Omaha recently by R. A. Leussler, vice-president and general manager of the Omaha & Council Bluffs Street Railway. The hearing was in response to a petition from patrons who urged the commission to order the company to restore the old system of stopping at every intersection. Cars are stopped at every downtown intersection, and beyond this district the stopping points are indicated on poles by black lettering on a field of yellow.

Mr. Leussler testified that a test made for the year 1919 showed that the operating expenses were reduced $56,663 by reason of the skip stop, and of that amount $16,097 was a saving in coal expense. He told the commission that the new system yielded the equivalent of 13,444 additional car hours per year, and that the average speed of cars had been increased from 9.3 to 9.4 miles per hour. He estimated that it would cost $65,000 more this year to return to the old plan, with no appreciable enhancement of the service.

More rapid and comfortable service and the lessening of accidents were some of the arguments offered in favor of the skip stop. The commission will take the matter under advisement.

Ten-Cent Fare Refused

New Jersey Utility Commission Follows Precedent Established in Public Service Railway Ruling

Eight cents will be the fare in Trenton, N. J., on and after June 27. The present 1-cent transfers will be continued. This was the ruling made on June 20 by the State Board of Public Utility Commissioners on the application of the Trenton & Mercer County Traction Company for a 10-cent fare.

The board held that the present 7-cent rate was "insufficient and unreasonable," but it was not satisfied that a 10-cent rate was just and reasonable and refused to approve that rate.

The board estimated that the increased fare of 1 cent will give a return to the company of nearly 7 per cent on the highest estimate of the value of the company's property and approximately 8 per cent on the lowest estimate.

Increase from Higher Fare $185,000

The increased revenues under the new rate, the board calculated, will be approximately $195,000 additional, and deducting about $10,000 for the extra franchise tax which must be paid on the increased gross receipts, the total increase from the higher fare will be $185,000. This added to $158,000, the prospective net revenue of the company from the 7-cent fare, would total $343,000 the entire net income.

If a 10-cent fare should be charged and the number of passengers estimated by the company should be carried, the board pointed out, the return would be more than the company was fairly entitled to. On the other hand, however, if the result of such fare should materially curtail the use of the trolleys, the value of the service would be impaired and lessened to the public and the company might not obtain more revenue than would accrue under an 8-cent fare.

The Board of Public Utility Commissioners took into consideration not only the Ford, Bacon & Davis report, but also the valuation heretofore fixed by the board in its report of Dec. 13, 1915, and Dec. 26, 1919. The valuation in the latter appraisal was $3,918,011, including working capital of $100,000.

Various Appraisals Considered by Board

The appraisal of 1915 totaled $4,254,657, while the Ford, Bacon & Davis appraisal based upon pre-war costs was $4,334,192. In addition there was a valuation of $4,875,000 made by J. G. White & Company in a former proceeding, in which war time prices were recognized. The Ford, Bacon & Davis report, the board said, however, expressed a conclusion, not based upon actual costs, that the value of the property taking into consideration pre-war prices, war prices and post-war prices, would be in the neighborhood of $5,000,000. The board stated that due consideration was given to all these appraisals.

Jitney Procedure Announced

New Jersey Commission Lays Down General Conditions Under Which It Will Grant Permits

The State Public Utilities Commission of New Jersey in a recent decision announces that jitney service is accepted by the board as a legislative authorized method of transportation, enjoying the same sanction of law with electric railways. In all future applications for licenses by jitney operators, the board announced it will proceed on the theory that the Legislature deemed jitney service proper in that it refused to curtail the use of such transportation and because it decided to give jitneys the authority and sanction of law in the same manner as any other system of transportation. The board held, however, that municipal licenses granted must have the approval of the commission before they are valid. Attempts to operate under municipal licenses, without the board's approval, are illegal. The Public Service Railway will probably appeal to the Supreme Court for a review of the decision.

The board's finding in part is as follows:

> There are, therefore, in many cities of the state two systems of street transportation: the electric railway and the jitney, recognized by and enjoying the equal sanction of the law. Indeed, if either system can be said to be favored by the Legislature it would seem to be the jitney because while the Legislature has placed all street railways under the jurisdiction of this board it has expressly refused to place jitneys licensed before March 15 of this year and operated over their April 6 routes, by limiting its power of regulation solely to such as should be licensed after March 15.

The board granted permission to C. A. Becker to operate a bus line on the Newark-West Orange line and at the same time refused to approve twenty-six applications for licenses granted by Hoboken to operate on Washington Street between Fourteenth and the Hudson and Manhattan Tube tunnel, a distance of approximately a mile. In denying the Hoboken license the board said:

> We are of the opinion the necessity does not require additional jitney service as the same will not add to the comfort and convenience of the riders, but on the contrary will add to the inconvenience of others who have to use the streets or cross the same.

There are 125 jitneys in operation on this Hoboken route.

The commission also announced that because the Atlantic Coast Electric Railway operating in Asbury Park and other seashore towns has recently materially improved its service it would issue no licenses for jitneys to run parallel with the trolley lines.

Bonus Plan for Trainmen Abandoned

The Dallas (Tex.) Railway has abandoned its plan of bonus pay for trainmen, as it did not prove satisfactory, according to Richard Meriwether, vice-president and general manager, who inaugurated the scheme as an inducement to careful operation. The scheme of reward provided that a monthly bonus of 2 cents an hour for all time worked was to be paid to motormen if they were free from any accident during the month. The conductor received a corresponding amount if his record was clear from any complaint arising out of his contact with the public.

The plan was installed early in 1920 and was continued during a large part of the year. It followed an earlier plan whereby the company divided any saving in the cost of accident claims under 4.5 per cent of the gross receipts, in the proportion of 75 per cent to the men and 25 per cent to the company. This reward was paid only at the end of the year and was distributed among the men according to the number of hours' work they had put in during the year. This did not prove to stimulate any great improvement in the number of accidents, and it was abandoned for the plan of monthly payment of a fixed amount, also abandoned.

Dallas Asks for Continuance of Six-Cent Rate

The Dallas (Tex.) Railway, having lost its fight for a 7-cent fare, has filed with the City Commission an application for a continuance of the 6-cent fare for another year. The 6-cent fare was granted on June 25, 1920, for a period of one year, with a proviso that if the company's finances were in such shape at the end of that period that it could not operate on a 5-cent fare and show earnings of 7 per cent as provided in the franchise, the 6-cent fare would be continued for another year at the request of the company. The City Commission is expected to approve the application before June 25 so that the company can continue on the 6-cent fare basis without interruption.

The application of the company for a continuance of the 6-cent fare represents that the company can not reduce fares to 5 cents at this time and continue to operate and maintain the present standard of service. It is set forth that the present 6-cent fare was granted by the City Commission as a relief measure during negotiations for a service-at-cost franchise, but that such negotiations were called off without material result having been obtained. The traction company then sought a 7-cent fare on the ground that a 7-cent fare charge was necessary in order that a return of 7 per cent on the agreed valuation might be shown. The application for a 7-cent fare was denied by the City Commission on May 2, 1921.

Richard Meriwether, vice-president and general manager, who signed the application of the traction company, declares that unless there is a further reduction in operating costs or unless the company is relieved of certain burdens now imposed on it by the city, such as bearing the cost of paving between its tracks, officials feel that they will not be able to keep pace with the growing requirements of Dallas. He says the company probably will continue to show its authorized return of 7 per cent but that it will not be able to rehabilitate its credit.

Fares to Be Reduced

Cincinnati, by Deferring Certain Franchise Payments, Will Benefit Almost Immediately

Amendments to the ordinance governing the operation of the Cincinnati (Ohio) Traction Company were passed during the week ended June 18 by the City Council, assuring the public of a decrease in fares on Aug. 1 and Nov. 1 of this year. The fares will be reduced one-half cent on each of the dates mentioned. The amendments were passed by twenty-seven votes to three.

The session of Council at which the amendments were adopted was marked by frequent squabbles arising over the proposed action of Council in passing the amended ordinance. Several Councilmen who voiced bitter opposition to the new plan at a public hearing several days prior again took the floor against the measure.

Before the amended ordinance was voted on, Saul Zielonka, City Solicitor, explained the workings of the ordinance, showing how the amendments will effect a great saving. After Mayor John Galvin signed the ordinance he issued a brief statement saying that he did so because he wanted fares to come down as soon as possible.

A letter of opposition to the new plan sent to the Council committee on street railways by the Chamber of Commerce was ordered received and filed.

William Jerome Kuertz, Director of Street Railways, said that the new ordinance would pave the way to lower fares with the help of a readjustment of economic conditions.

The ordinance is entitled as follows:

> To provide for the reduction of the cost of carrying passengers on the street railway system of Cincinnati by the suspension of certain payments and accruals provided to be made by Ordinance No. 253-1918 of the City of Cincinnati, and to provide a reduced rate of fare for school children in said city.

The amendments to the original service-at-cost grant have been explained by Mr. Kuertz. He says that the savings made through wage reductions, lower coal prices and the new power contract with the Union Gas & Electric Company in September would not be noticeable in reduced fares for several years under the present franchise. He pointed out that the Cincinnati Traction Company has been unable to pay its accumulated deficits and scarcely has earned enough for its capital charges. It was contended by him that the proposed ordinance provided a change which would permit the public to get the immediate benefits of present reductions in operating costs without suffering any loss of franchise tax, but merely deferring that obligation.

Line Resumed and Fare Cut.—The Revere Beach prepayment loop of the Eastern Massachusetts Street Railway, opposite the State Bath House, Boston, Mass., has been reopened for the summer season. The fare between Scollay Square and Revere Beach has been reduced from 15 to 10 cents on the Bay State lines by way of Chelsea.

Seven Cents Desired

Richmond Railway Wants This Rate Pending Permanent Franchise Settlement

In support of the request of the Virginia Railway & Power Company for an increased fare in Richmond from 6 to 7 cents, President Thomas S. Wheelwright has given to the business organizations of the city a statement of the company's affairs showing that there are held by Richmond people 22,284 of the 85,000 shares of preferred stock, or more than 26 per cent, and 35,099 shares of the 120,000 shares of common stock, or 29 per cent.

The historic value of the Richmond street railway property made by Stone & Webster, that is to say, money actually invested, plus interest, less any returns paid to investors in the past 25 years, amounts to....	$20,249,400
The present value of the Richmond street railway property now in the service of the public, according to the inventory and appraisal of Stone & Webster, is	12,488,841
Showing an actual shrinkage in value of	$7,760,559

The securities allotted to the Richmond street railways on the basis of its present value are as follows:

Bonds	$6,725,366
Preferred stock	2,671,800
Common stock	3,317,708
Total	$12,714,874

The interest on these bonds at 5 per cent and 1 per cent sinking fund amount to..........	$403,522
Under the 6-cent fare the company contends it is now earning only 1.3 per cent, or at the rate of..................	86,959
Leaving a deficit on account of bond interest of.............	$316,563

In his statement, Mr. Wheelwright says:

> We estimate that allowing for the actual falling-off in travel we will haul about 40,000,000 revenue passengers under the 7-cent fare which would give a gross increase in revenue of $400,000, 10 per cent of which will have to be paid to the city as a franchise or license tax, leaving an estimated balance of $360,000, from which will have to be deducted the difference between the 7-cent fare and school ticket fares at 2½ cents, which, based on last year's figures, will amount to $45,000, leaving a net estimated balance of $315,000.
>
> Hence you will see that if the 7-cent fare is granted it is only an emergency measure pending the working out of a franchise which will recognize the value of the property used in the railway service and fix such fares from time to time as will insure the integrity of the investment, thereby securing a basis for credit upon which further capital investment may be obtained.

Bus Measure Upheld

The constitutionality of Toledo's bus regulatory ordinance has been upheld by Common Pleas Judge Curtice Johnson following arguments by bus owners and the city attorneys.

The temporary injunction against the enforcement of the ordinance will stand for a few days, however, to allow an appeal to be taken before the County Appelate Court. It is believed that this appeal will be heard soon so that the ordinance may be enforced if upheld.

William Powlesland, bus owner, who brought the suit against the city, claims that the bonds required make operation of buses prohibitive. At law it was claimed that the ordinance was invalid because it contained more than one subject matter.

"The ordinance, I find," declared Judge Johnson, "contains but one subject matter, that of the regulation of buses."

It is said that the buses have been taking away approximately $700 a day from the railway by operating on the best paying lines at peak hours and for short hauls only.

Stage Lines Cannot Give Local Service

Operative rights of automobile transportation companies engaged in business before the regulatory statute of May, 1917, are announced in a decision by the California State Railroad Commission of June 10, 1921.

The commission holds the right of regulation rests in the commission, and extensions of service are subject to permit. This applies particularly to the inauguration of local service. This decision was rendered in the case of the Crown Stages Company against the White bus line and the White stage line. In this case the commission ordered the White bus line and the White stage line to desist operating as a transportation company between Santa Ana and Anaheim and intermediate points. The defendant companies hold an operative right for a through service between Los Angeles and San Diego, and because of this claimed the right to operate a local service between Santa Ana and Anaheim, which are way points, without obtaining from the commission a certificate of public convenience.

The commission holds that, notwithstanding the defendant companies were operating before the statute of 1917, they are subject to regulation by the commission. The decision says:

> The only basis for any distinction between transportation companies operating prior to May 1, 1917, and those which commenced subsequent to that time is in the manner of creation of their operative rights.

The commission in its decision points out and holds that the act in effect declared that such operations as were actually being carried on in good faith on May 1, 1917, would be recognized as a lawful right to be exercised by those then in enjoyment. Every subsequent deviation from or change in such operations must be under the approval and authorization of the regulatory body.

The decision also lays down the rule that a company would have the right to put on local service to the extent only that it was its duty to render it as the company had held itself out to do prior to May 1, 1917.

This ruling will affect a number of companies operating under rights acquired before May 1, 1917. The commission holds that all companies originally operating between through points must obtain a certificate of public convenience and necessity in order to initiate local service.

Transportation News Notes

Fares Must Go Up in Findlay.—The fare at Findlay, Ohio, will be increased to 10 cents beginning July 1. The lines there are operated by the Toledo, Bowling Green & Southern Traction Company, under the service-at-cost plan and have been showing a deficit under an 8-cent fare. Riding has shown a decrease each month since the plan was adopted.

Lower Fares in Effect.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has announced a new fare schedule whereby thirteen tickets will be sold for $1, heretofore restricted to workingmen. It is believed that the lower rates will increase the patronage which decreased after September, 1920, when the 10-cent rate went into effect. This 10-cent rate remains in force for cash fares. The lower rate will be an experiment, the company reserving the right to revoke the order if operation under it is found to be unprofitable.

Jitneys Ruled Off Flint Streets.—In order to eliminate traffic congestion on streets where cars are operated the Flint City Council recently ruled jitneys off streets on car line routes. The ordinance provides that bus operators will have to file with the city clerk a statement on the proposed route, terminals and hours of operation. Approbation of the council will be necessary before jitneys can run. Recently the Flint City Council authorized a 6-cent rate after the Detroit United Railway which operates in Flint had asked for a fare readjustment and the elimination of bus competition.

New Rates Filed.—The Pacific Power & Light Company, Astoria, Ore., has filed a new tariff with the Oregon Public Service Commission providing increased fares on the traction lines of the corporation, together with slightly advanced charges for gas. Under a new law enacted at the last legislature, tariffs of this character have to be filed with the public service commission 30 days before becoming effective. If not suspended by the commission before the end of the 30-day period, the rates become operative without a hearing or other formality. For single rides up to the length of the line in either direction, the company has asked that the cash fare be increased from 5 to 7 cents. Ticket books, good for 50 rides up to the length of the lines in either direction have been fixed at $3, while student ticket books, good for 40 rides up to the length of the lines in either direction have been set out in the tariff at $1.75. This is an increase from $2.50 for five-ride ticket books, and $1.50 for student ticket books.

Personal Mention

New Officers for Southern Public Utilities Company

D. G. Calder, manager of the Charlotte branch of the Southern Public Utilities Company, has been selected treasurer to fill the vacancy caused by the election of E. C. Marshall as president to succeed Z. V. Taylor. A. B. Skelding, of utility fame, now steps into the managership of the property.

Mr. Calder is well equipped to fill his new position, having gained much experience since assuming the managership when the company was formed some years ago. Prior to his services with the Southern Public Utilities he was connected with the Catawba Power Company.

A. B. Skelding, the new manager of the Charlotte branch, is one of the best known utility men in the South. For the past three years he has been assistant to the president of the Carolina Shipyard. For many years prior to his association with the shipyard he was general manager of the Tidewater Power Company. His record of service includes experimental work with Thomas A. Edison and managing railway systems at Knoxville, Tenn.

Life Sketch of "Sam" Riddle

A brief review of the business life of Samuel Riddle and his connections with the Louisville (Ky.) Railway was recently published by a local paper, along with a silhouette of the man. It was said that during the time that Mr. Riddle has been with the railway he has been in practically every department in an executive capacity.

Commission Man Heads Engineers

Harry O. Garman, Indianapolis, Ind., has been elected president of the American Association of Engineers at its annual meeting in Buffalo. The organization has more than 25,000 members. Mr. Garman, who was first vice-president of the association, was nominated by the Indianapolis chapter. He is chief engineer for the Indiana Public Service Commission, with which organization, together with its predecessor, the State Railroad Commission, he has been associated for more than thirteen years. He is a past-president of the Indiana Engineering Society, member of the American Railway Engineering Society, associate member of the American Society of Civil Engineers and associate member of the American Institute of Electrical Engineers. For ten years he was an instructor and associate professor of civil engineering at Purdue University. He formerly was assistant engineer of the Illinois Central Railroad, and is a director of the City Trust Company, Indianapolis.

New Twin City Vice-President

T. Julian McGill, Westinghouse Man at Chicago, Enters Railway Operating Work

T. Julian McGill has been elected by the board of directors of the Twin City Rapid Transit Company, Minneapolis, Minn., vice-president of that company and underlying companies. Mr. McGill will move to Minneapolis within the next sixty days and will take up actively his duties as vice-president in charge of operation of the Twin City lines.

T. J. McGILL

Mr. McGill is at present manager of the Westinghouse Company's largest distributing plant in Chicago. He is well known throughout the entire West, more particularly in Minnesota, where from 1903 to 1909 he was manager of the Minneapolis office of the Westinghouse Company, having charge of all the Northwestern States including Montana and a large part of Canada. He has been connected with the Westinghouse Company since 1898. In 1909 he was transferred to Atlanta and in 1914 was made manager for the company in Chicago with jurisdiction previously noted.

It is expected that as vice-president in charge of operation Mr. McGill will take over a large part of the work connected with that department which has previously devolved upon Horace Lowry as president of the company.

The Twin City System is one of the largest of its kind in the country with a wide diversity of interests, its activities even including the operation of steamboat service on Lake Minnetonka. In the system are included 452 miles of line.

Managers and Superintendents Reassigned by Eastern Massachusetts Company

Transfers of managers on the Eastern Massachusetts Street Railway have been ordered by R. B. Stearns, vice-president and general manager, effective on July 6. The changes were brought about as a result of the death of Manager James O. Ellis of the Chelsea District and the resignation of Manager Harrah K. Bennett of the Melrose-Woburn District. They are as follows:

Manager Frank I. Hardy of Salem to manager of Chelsea and Melrose-Woburn Districts.

Superintendent Vard B. Leavitt of Lowell to superintendent of Melrose-Woburn District.

Manager Maurice E. McCormick of Quincy to manager of Salem District.

Charles E. Whalen of Boston Office to superintendent of Lowell District.

Manager Garfield S. Chase of Haverhill to manager of Lawrence District.

Superintendent Francis J. O'Donoghue of Brockton to manager of Haverhill District.

Manager John H. Hayes of Lawrence to manager of Quincy District.

Manager Patrick F. Sheehan of Brockton to manager of Fall River District.

Manager A. J. Boardman of Fall River to manager of Brockton District.

Mr. Devlin's Successor Appointed

Harvey W. Brundige on May 10 took office as president of the California State Railroad Commission, following his election to succeed Frank R. Devlin, who resigned from the commission May 1. Mr. Brundige was appointed to the State Railroad Commission two years ago for a six-year term by Governor William D. Stephens.

During his residence in southern California he has been prominent both in civic affairs and in matters of state importance. He has a national reputation in newspaper circles, having worked for several years in the East before going to California. He formerly was editor of the Los Angeles *Evening Express*. By reason of his experience in commission affairs he is said to be unusually well fitted for the office of president.

The membership of the railroad commission is now composed of H. W. Brundige, Los Angeles; H. D. Loveland, San Francisco; Chester H. Rowell, Fresno; Irving Martin, Stockton, and H. Stanley Benedict, Los Angeles.

Jess Marple, former superintendent of the Moundsville division of the Wheeling (W. Va.) Traction Company, has resumed his old duties after working for some time in Pittsburgh. William A. Smith, who has been acting superintendent of the Moundsville division, has returned to his duties as night dispatcher at Tenth and Main Streets. William Meyers, who has been acting dispatcher, has resumed his duties as trainman.

Clarence J. Shearn, Ex-Supreme Court Justice, has been appointed special counsel to assist the New York Transit Commission. Mr. Shearn, experienced in municipal and railroad law, will guide the commission in outlining a new plan for transit reorganization.

Ivan Bowen, Mankato, Minn., has been appointed by Governor J. A. O. Preus to the Minnesota Railroad & Warehouse Commission to succeed the late Judge Ira B. Mills. Thus Mr. Bowen becomes a commissioner at the beginning of the action by the electric railways of the State to have valuations of their properties made on which the commission is to base its order for rates which the various companies may charge for fares.

Howard T. Kingsbury, attorney in New York City, has been appointed counsel to the Transit Commission, in place of Louis C. White, who has resigned to enter private practice. Mr. Kingsbury was formerly a special assistant to the United States attorney-general in the prosecution of anti-trust cases in 1914. He is a graduate of Yale University and New York Law School and at present is judge advocate general of the New York State Guard, with the rank of lieutenant-colonel.

W. R. Williams, secretary of the California Railroad Commission's office at San Francisco, resigned on May 11 to become examiner for the commission and the head of the Los Angeles office. He will be succeeded as secretary by Colonel H. G. Mathewson, commander of the 40th Railroad Artillery Regiment in the World War, former commander of the American Legion in California and at present assistant secretary of the commission. Mr. Williams succeeds as head of the commission's office in Los Angeles Miss Converse, whose resignation was noted in the issue of this paper for May 7.

R. E. Luellen, safety engineer, Union Traction Company of Indiana, Anderson, Ind., has been appointed chairman of the bulletin committee, electric railway section of the National Safety Council. This committee is charged with the work of collecting data from the member companies from which to prepare the weekly bulletins distributed by the council. Mr. Luellen is editor of the magazine *Safety* published by the Union Traction Company of Indiana and is in charge of the company's power saving department, which is engaged in a very successful campaign of investigating and reducing the power consumption of its cars.

Frank M. Kemp, who has been connected with the general offices of the Gary (Ind.) Street Railway since March, 1912, and who has been chief clerk for the last five or six years, was appointed on May 22 as treasurer of the company, and also of the Gary and Valparaiso Railway, to succeed the late Lewis E. Woodward. Mr. Kemp, in addition to his duties as treasurer of both traction companies, will discharge the duties of chief clerk until the latter position shall have been filled by appointment. The Gary Street Railway and the Gary and Valparaiso interurban system are operated by the same management, and for that reason Mr. Kemp became treasurer of both systems. The appointment was made today by President Charles W. Chase, who is president of both companies.

F. J. Foote Advanced

Experienced Master Mechanic Now Superintendent of Power on Ohio Electric

F. J. Foote who for the past twelve years has been connected with the Ohio Electric Railway, Cincinnati, Ohio, as master mechanic in charge of car equipment and shops, has been promoted to the position of superintendent of power. He has been given, in addition to his former duties, the supervision of the power houses and substations on those properties of the system known as the Indianapolis, Columbus & Eastern Traction Company and the Columbus, Newark & Zanesville Traction Company. This includes two large power houses and fourteen substations.

F. J. FOOTE

Mr. Foote is well qualified for the position of superintendent of power, being a graduate of the University of Illinois and a post graduate of the University of Wisconsin, where he received the degree of electrical engineer in 1902. He has also had wide experience in power station work, having held the position of electrical engineer on heavy construction work for both the Allis-Chalmers Company and the Westinghouse Electric & Manufacturing Company and was also for several years chief operating engineer for a large manufacturing company.

Before taking up his technical studies Mr. Foote learned the trade of machinist and worked in various shops for several years. He has found that the hard knocks and practical experience in the shop have been of great value to him ever since. Mr. Foote's headquarters are at Springfield, Ohio.

Obituary

Charles H. Edmunds, a member of the legal department of the Philadelphia (Pa.) Rapid Transit Company, died on May 6. He was also a member of the Board of Education of Philadelphia and a prominent attorney of that city. He was born on Nov. 26, 1862.

George C. Hoffman, who had been in the employ of the Third Avenue line of the Interborough Rapid Transit, New York, for nearly forty-one years, died at the age of sixty-two. During his railway career he had held positions as a train starter, dispatcher and day trainmaster of the Eastern Division.

Thomas S. Wood, for twenty-seven years resident counsel for the Duluth (Minn.) Street Railway Company and attorney for several railroads and other corporations, died suddenly of heart failure on May 18 at the age of sixty-three. He was an intimate friend of William H. Taft, former President.

T. E. Gatehouse, who for nearly forty years was editor and part proprietor of the *Electrical Review*, London, died several weeks ago in his sixty-seventh year. In his earlier days he was engaged in submarine-cable and electric-lighting work, and in 1882 he became editor of the *Electrical Review*, which is one of the most important technical publications in Great Britain. He was a member of the Institution of Civil Engineers, of the Institution of Electrical Engineers and a fellow of the Royal Society of Engineers. His death has caused a gap in British electric circles and in technical journalism.

Thousands Pay Final Tribute to Master Interurban Builder

Hundreds of railway and electric light men from all over Texas attended the funeral in Dallas, Tex., of Col. J. F. Strickland, whose death was noted in the ELECTRIC RAILWAY JOURNAL recently. Not only did business men from other cities come to pay tribute to his memory but thousands formed in a funeral cortege to show the high esteem in which the master interurban builder was held. Since his death telegrams and messages of condolence have been pouring in from utility operators and financiers located in all parts of the country.

Col. Strickland's death was caused by heart failure. He had been suffering with a weak heart for several months and had planned to start on a long vacation beginning May 23, in the hope of regaining his strength. Physicians say his heart trouble resulted from overwork. He was an indefatigable worker and had been at his office early and late recently on account of the application to city commissioners for an increased fare.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Still Lower Prices on Scrap Iron and Steel

Pig Iron and Sheet Prices Show Revisions Downward in Market About 25 per Cent in Production

During the past week, while there have been only few price revisions of new steel and iron products, there have been several items in the scrap lists which have succumbed to lower prices. Basic pig iron, delivered Pittsburgh, is off 50 cents to $22.96; foundry in Chicago, delivered, is off the same amount to $21.70; No. 2 foundry, Cleveland, is off nearly $1 to $23.50, and various pig irons, f.o.b. furnace, Buffalo, are off from 50 cents to $2. There is a $5 lower market in sheets, quotations on black sheets, Pittsburgh, being obtainable at 3.75 cents and galvanized at 4.75 cents. The upper limits are 4 and 5 cents respectively. The range on blue annealed is 2.85 cents to 3.10 cents. Activity in the steel industry is extremely low with little change from the average rate of operation of 25 per cent noted last week.

The scrap metals show several reductions. Old iron car wheels are $1 lower in Pittsburgh to $14-15 in gross tons, delivered; 50 cents lower in Chicago to $13-13.50 and $1.50 lower in New York to $12.50-13. Steel car axles in Pittsburgh are 50 cents off to $14.50-15.50; steel railroad axles in New York are $1 lower to $10.50-11; in Chicago the drop is 50 cents to $13-13.50. Rerolling steel rails in New York show a 50-cent reduction to $9.50-10; in Philadelphia the result is $1 off to $12.50-13. Old iron rails at Chicago are $1 lower to $16-16.50. Frogs, switches and guards are 25 cents lower in Chicago to $10.75-11.25, and old short steel rails there are off 50 cents to $12-12.50. Steel springs in Chicago are also 50 cents lower to $12-12.50. In this scrap market, too, buying is listless.

Prompt Deliveries of Motor-Driven Track Grinders

Good Demand of First Quarter Reported to Have Shown a Decrease Recently—Some Repair Buying

Buying of motor-driven track grinders is not large at the present time, manufacturers report. One of the largest producers does say that demand was very good during the first quarter and well into the second, but recently it has shown a marked falling off. On the whole, makers of this class of equipment do not seem pessimistic, for some report that considering present abnormal business conditions the volume of orders received is good; others state that they would not expect a large sale of new equipment just now. A few inquiries are being received from steam roads but not many orders. A feature of the present market is the number of orders received in certain quarters for repair parts to enable electric lines to put their track grinding equipment into shape.

Shipments are exceedingly prompt in general, some producers being able to ship motor-driven grinders in one week or even less, and others being able to deliver up to three machines at one time within ten days of receipt of order. Of course this varies depending upon the electrical specifications and capacity of the tool. Raw material is in plentiful supply and about the only limiting factor in deliveries is the time of manufacture.

Raw material in this field has been reduced from 20 to 50 per cent, it is stated, but the price situation on the finished product is not uniform. One producer, for instance, has reduced prices 10 per cent, while another has made no cut, it is stated, because prices were not boosted during the war. Working forces have been reduced as much as one-third and wages are down about 12 per cent with some manufacturers, while several others report no reduction in wages as yet, though conditions, it is stated, make it seem as though this will be necessary.

Germans Competing for Railway Business

That recent activity in Germany along certain lines of steel manufacture such as rails and car wheels has offered competition to American producers has been previously noted in these columns. Germany plans to make further bids for wresting business away from foreign competitors, however, for according to a report of the Guaranty Trust Company of New York, just issued, the government has reduced export duties on pig iron, machine parts, rails, sleepers, axles, points, springs and ball bearings among other products. The new rate is 1 per cent, compared with a tax of 3 to 10 per cent formerly.

In addition the report states that the Linke-Hofman Company at Breslau, one of the leading German manufacturers of railway stock, has just completed large orders for the Belgian, Czecho-Slovakian and Norwegian governments. The manufacturers of railway supplies in Germany report a veritable glut of orders, especially from South Africa, France and China. The Russian Soviet government has placed a large order in Germany for rails, sleepers and other permanent way materials.

National Pneumatic Company After European Business

President and Vice-President, Soon to Sail, Believe Manufacturers Here Must "Beard Lion in Den"

With the object of stimulating interest abroad in the products of their company, Harold Rowntree, president of the National Pneumatic Company, New York City, and Thomas W. Casey, vice-president, expect to make a business trip to Europe next month. Mr. Rowntree and Mr. Casey will sail on the Olympic, July 16, to be gone about three months. Their itinerary includes London, Paris, Holland, Italy and possibly Madrid. Among the more important properties they will visit are the London underground railway system, the Metropolitan Underground of Paris and the Amsterdam surface lines, the latter of which is already doing business with the National Pneumatic Company.

The most important object in view in making this trip, Mr. Casey states, is to interest the two main underground railway systems of Europe in the American practice of multiple-unit system of train control. A subway is now building in Madrid, Spain, which will offer a possible additional market. It is not the intention to visit Germany at the present time. Second to the institution of this system of train control will be the endeavor to interest railway lines in the company's system of pneumatically operated doors.

Mr. Casey is very optimistic over the prospects for business abroad. At the present time he believes that American manufacturers are sitting by too quietly waiting for both domestic and export business to come to them, when the proper procedure he thinks, is to "beard the lion in his den." "The business is there waiting in Europe, but American producers must go after it and wake up foreign buyers before the three obstacles of exchange rates, tariff and competition will ever be overcome." If the company finds a decided prejudice against products manufactured outside the buyer's own country, it will endeavor to have other countries manufacture under its patents.

Current Prices of Cross-Arms

In connection with the article on buying of cross-arms which appeared in last week's issue mention was made of a 10 per cent drop on yellow pine arms earlier this month. Prices now in effect on these arms, quoted by a representative producer, are given below.

The quotations given cover 75 per

cent heart, long-leaf yellow pine and are made f.o.b. Hattiesburg, Miss. Corresponding prices of McCormick fir arms are also given.

Electric light arms, two-pin, 3 ft. x 3¼ in. x 4¼ in., less than 1,000 lineal ft., $28.61 per 100 net, over 1,000 lineal ft., $25.43; 6 ft. x 3¼ in. x 4¼ in., six-pin, less than 1,000 lineal ft., $57.23, over 1,000 lineal ft., $50.87; N. E. L. A. arms, 5 ft. 7 in. x 3½ x 4½ in., four-pin, less than 1,000 lineal ft., $64.72, over 1,000 lineal ft., $57.52; New England arms, 5 ft. 6 in. x 3¼ in. x 4¼ in., four-pin, less than 1,000 lineal ft., $57.23, over 1,000 lineal ft., $50.87. Quotations on the same size arms as above, in the same quantities f.o.b. cars Rutherford, N. J., on McCormick fir are as follows: $51.09, $45.41; $102.18, $90.83; $115.56, $102.72; $102.18, $90.83.

Excellent Deliveries on Malleables

Production Down to One-quarter Capacity as Buying Is Flat—Prices from 5 to 25 per Cent Down

Under present conditions of demand delivery of malleable-iron products is only limited by the time required in manufacture. For standard-pattern items this would probably range in the neighborhood of one month. In view of the situation prevailing in the malleable market just one year ago it seems almost incredible that conditions could have exactly reversed in so short a time. Twelve months ago deliveries were anywhere up to a year behind, while at present operation in this field is only about 25 per cent of capacity and new business is very scarce. The automobile trade, one of the large consumers of malleables, has long been flat, and though it shows some improvement now, automobile manufacturers are well stocked with malleable material purchased at higher prices than now prevail. Railroad buying amounts to little or nothing at present and foreign purchasers are not buying in this country. To make the depression seem worse, the industry is undoubtedly "over-factoried" as a result of war-time expansion.

Prices have followed the pig-iron market down, but not nearly to so great an extent because of the labor factor. Valley furnace malleable pig, Pittsburgh, is worth $23 per ton at present, a drop of more than 50 per cent from the peak. Prices on heavy malleables are estimated to be down from 20 to 25 per cent and more, but on light castings the drop has not been great, being only about 5 to 10 per cent. The reason for this difference is the increased unit cost on the small items due to handling, labor and other charges. Wages are down about 20 per cent, it is stated.

At the present time word has already gone out in the trade of a further reduction in the price of malleables to be made on July 1 amounting to 10 per cent. There seems little hope of this bringing about a stronger volume of buying, very soon, however.

Wood Tie Demand Not Responding to Low Prices

Existing High-Priced Contracts Which Expire July 1 Retard Buying—Water Freight Rates Down

Although producers state that the present is a favorable time to buy wood ties, and prices are down to a level that even buyers admit is about bottom, demand has shown little or no improvement. Current buying is for spot shipments and in much smaller quantities than usual, as it merely covers imperative maintenance needs. Some producers are optimistic that the wood tie business will pick up late this summer, but others can see no activity ahead this year.

Since before the war the roadbed maintenance needs of railroads have piled up and that there is a good future market most people admit. The unknown factor is the extent to which roads throughout the country are stocked with ties, as reports differ on this. If one large steam railroad in the East is a criterion then stocks of ties awaiting use are large, but on the other hand some producers believe they are small in general. Contracts for ties delivered along the right-of-way will not run out until July 1 in a number of instances, and this of course has retarded buying as existing contracts were placed at the high prices of last year. It is these ties, purchased to cover forward needs while deliveries were running long, that represent existing stock in certain quarters.

Producers have decreased production materially, in fact cuttings are made to replace surplus and little else and stocks are under normal too, but at the same time competition is very keen and immediate deliveries are made in general. Prices, as stated before, are well down. A hewn, yellow-pine, sap tie, 8 ft. x 6 in. x 8 in. that sold delivered in New York harbor for $1.65 each at the peak price during the last half of 1920 now brings 95 cents each, a drop of 42 per cent. This reduction is in large part due to the decrease in water freight rates, as most of the Southern pine ties are shipped by water. The present water freight rate on ties shipped to New York in a representative instance is 35 cents each plus a 3-cent tax. This represents a 36 per cent cut from the peak rate of 55 cents and 3 cents tax.

Possible Electric Project for Asia Minor

The National Assembly of the Angora government, according to a report from Assistant Trade Commissioner Gillespie at Constantinople, has authorized the construction of a railway from Sivas to Samsun on the Black Sea. It is quite possible that sufficient water power may be developed from the Kizil Irmak River to permit the electrification of this railroad, which will be less than 200 km. in length. No equipment has been purchased nor has contract for construction been placed.

Rolling Stock

Orleans-Kenner Electric Railway Company, New Orleans, La., has placed in operation one 35-ft. combined passenger and freight-carrying interurban car with a seating capacity of forty-eight persons. The car was built at the company's own shops and completed in thirty days' time, believed to be a record for car construction in the South.

Pittsburgh (Pa.) Railways, mentioned in the Nov. 6, 1920, issue as purchasing twenty-five new double-truck cars, has placed the first of these cars in service. The remainder will follow at the rate of four or five a week, and delivery of the entire number will be completed by July 15, it is expected. The cars, which cost about $14,400 each, are the product of the Standard Steel Car Company, Pittsburgh, Pa., being equipped with Westinghouse electrical apparatus and air-brakes. They were purchased out of the general earnings of the company.

Recent Incorporations

Depew & Lancaster Railway, Lancaster, N. Y.—The Depew & Lancaster Railway, Lancaster, N. Y., has been incorporated by J. J. and E. J. Lenahan and P. Fitzpatrick. The company is capitalized at $200,000 and proposes to operate an interurban electric line from Lancaster to Cheektowaga. The company is represented by T. C. Burke, Marine National Bank Building, Buffalo. This is the successor company to the Buffalo & Depew Railway sold some months ago.

Track and Roadway

Morris County Traction Company, Morristown, N. J.—The Morris County Traction Company is laying new steel rails and new ties and removing the line from the middle to the side of the streets through Wharton, N. J.

Cleveland (Ohio) Railway. — The Cleveland Railway is planning to build 25 miles of new track this summer to replace existing construction. Of this amount, approximately 9 miles have been completed to date.

Tulsa-Sapulpa (Okla.) Interurban Railway.—The Tulsa-Sapulpa Interurban Railway, controlled by the Oklahoma Union Railway, has announced that it will extend its electric line from Keifer to Okmulgee before the end of the year. The extension has been talked of for some time, and will pass through Mounds and Beggs and the rich Beggs oil district adjacent to Okmulgee.

Windsor, Ont.—The Windsor City Council on June 14 authorized the expenditure of $900,000 for improvement of the local street railway system, which is operated by the Hydro-Electric Power Commission of Ontario.

Toronto (Ont.) Railway. — The Toronto City Council, at a meeting on June 14, sanctioned a credit of $7,000,000 for rehabilitation, extensions and equipment for the Toronto Railway system.

Portland Railway, Light & Power Company, Portland, Ore.—A communication demanding that the Public Service Commission of Oregon compel the Portland Railway, Light & Power Company to make the improvements in the maintenance and repair of its tracks which were promised at the time that an increase from 6 to 8 cents in fare was granted was forwarded to Salem recently. It is claimed that the city has failed by a total of $750,976 to keep its implied promise.

Dallas (Tex.) Railway.—The Dallas Railway has no funds with which to lay tracks on St. Paul from Elm to Commerce Street, necessary to make possible the rerouting of the Harwood-Oak Lawn cars to eliminate the "gooseneck" routing down McKinley Avenue and Lamar Street. To lay tracks on St. Paul from Elm to Commerce would cost $100,000, according to engineers of the traction company. The new line on Masten Street will not be used, at least for the present, except for a distance of one block, the San Jacinto line being rerouted to use this portion of the new line.

Tacoma Railway & Power Company, Tacoma, Wash.—The Tacoma Railway & Power Company, according to Manager Richard T. Sullivan, cannot consider the extension of the street car line into the Stevens Street district at its own expense. At a recent meeting of the company officials, city officials, and residents of the district various methods of securing construction of the line were discussed, but no agreement was reached.

Power Houses, Shops and Buildings

United Railways, St. Louis, Mo.—The United Railways is considering putting in operation automatic substations for city use. The total capacity will be 8,000 kw.

Public Service Railway, Newark, N. J.—The Public Service Railway is building a new terminal at the entrance of Clementon Park, Camden County. Double Tracks are being laid on the terminus to give better service, and the building of a ticket office will begin soon. The company has placed a scissors cross-over at the Berlin road crossing so cars can be switched from one division to the other.

Cleveland (Ohio) Railway. — The Cleveland Railway is making a study of its entire power distribution system looking to complete revision of the feeder system. This study is being made partly to determine whether there is any copper not being fully used, and preparatory to the change in the power supply system which is going forward with the installation of automatic substations.

Professional Note

Charles W. McKay, until recently president of the firm of McKay & Sherman of Chicago, has become identified with the American Appraisal Company in the capacity of engineer, Public Utilities Department. Mr. McKay has been engaged in engineering and appraisal work since his graduation from Sibley College of Mechanical Engineering, Cornell University, in 1906. In July, 1906, he entered the employ of the New York & New Jersey Telephone Company (now the New York Telephone Company), and in 1909 he was appointed engineer for the North Brooklyn district, having charge of the preparation of plans and estimating for all outside construction work within the district. In 1911 he was appointed engineer of the Borough of Queens. During the year 1912-13 Mr. McKay was associated with Henry Floy in the capacity of assistant engineer, and in the summer of 1913 he became engineer to the McCall & Clark Company, of New York City. In October, 1913, he became affiliated with McMeen & Miller, Chicago, and later engaged in valuation work for the Central Union Telephone Company, and continued in this capacity until his appointment with the Cooley & Marvin Company as chief appraisal engineer. He later accepted a similar position with L. V. Estes, Inc., of Chicago.

Trade Notes

Frederick C. Horner, for several years transportation engineer of the Packard Motor Car Company of New York, is leaving the Packard Company June 18 to spend two years in Europe in order to make a close study of transportation practice in England, France, Belgium and Germany.

Handlan-Buck Manufacturing Company, St. Louis, Mo., manufacturer of railway supplies, announces the death of its president, A. H. Handlan, on May 28. Mr. Handlan was one of the pioneer railroad lamp and lantern manufacturers in the company's territory, having been in business more than fifty years. His three sons will continue the business as usual.

Barney & Smith Car Company, Dayton, Ohio, according to a recent statement of company officials, expects to receive sufficient orders from the Government of Mexico to justify reopening the plant, contingent upon the recognition of the Obregon government by this country. In this connection Lee Warren James, attorney and representative of the car company and Valentine Winters, receiver, made a trip to Mexico and as a result a number of well-known Mexicans have come to Dayton. Matters have now progressed past the tentative stage and Mr. Winters states that recognition of the Mexican government will mean the reopening of the Dayton car works.

Metal & Thermit Corporation, New York City, in order to handle more satisfactorily its growing detinning business in the West, has constructed and will shortly place in operation in South San Francisco, Cal., a large new plant for the production of detinned billets, in addition to the detinning plants already operated by this company for several years at Chrome, N. J., and East Chicago, Ind. The new plant has also been equipped with a large welding shop containing equipment and facilities for undertaking repairing by the Thermit process. With this new equipment at its disposal the company is well prepared to render service to its Western customers. The new South San Francisco plant will be in charge of E. Kardos, superintendent. The cost of the plant is estimated at about $800,000. The former offices of the company, located at 329-333 Folsom Street, San Francisco, have been moved to the new location.

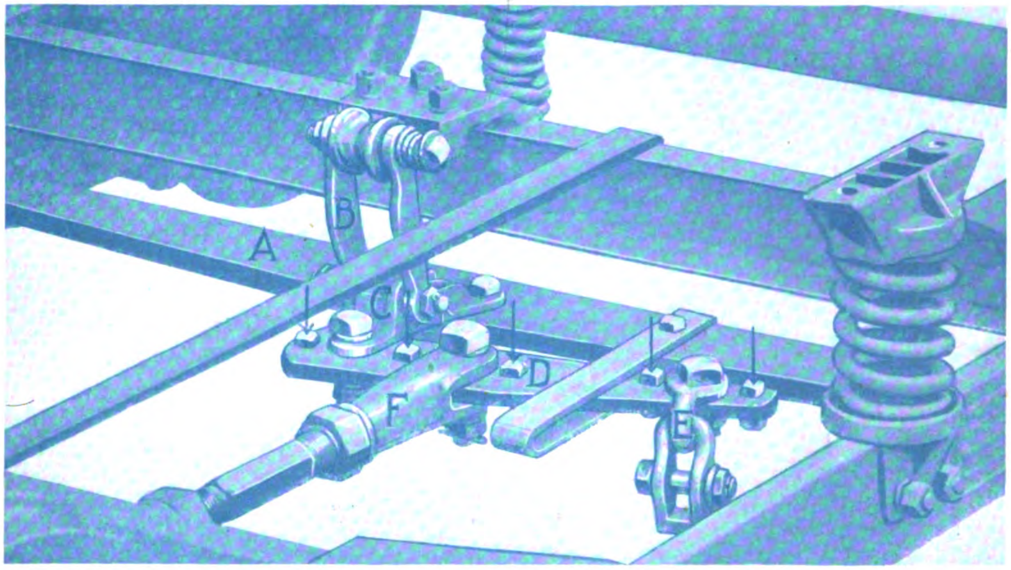
Howard R. Gass, for the past seven years senior in the engineering department of the Missouri Pacific Public Service Commission, has been appointed sales engineer for the St. Louis Car Company. During his association with the Missouri Commission Mr. Gass was engaged in the valuation of the properties of a number of important electric railways, also handling accident investigations, grade separation problems, signal and interlocking matters and conducting the annual inspection of steam and electric railways for the commission. Prior to this connection Mr. Gass was engaged in steam railroad construction work, having been in charge of viaduct and subway construction, third division of the Kansas City Terminal Railways, and field engineer in charge of all operations for the Union Depot Bridge & Terminal Company, North Kansas City, Mo., also having been associated with the Big Four, Kansas City Southern, St. Louis & San Francisco, M., K. & T., and other properties located in the Southwest.

New Advertising Literature

Steam Turbines.—Bulletin No. 42,019 of the General Electric Company is on the Curtis Steam Turbines for mechanical drive.

Transformers.—The Enterprise Electric Company, Warren, Ohio, is distributing a four-page pamphlet covering its "Peerless" transformers.

Hoists.—Two recent bits of publication from the Electrc Hoist Manufacturers' Association, 165 Broadway, New York City, embody the slogan—"The Strong Arm of Industry." One of these bulletins, "Approved Applications," pictures and describes under 133 headings partial uses to which electric hoists have been applied, while the other one, "Monorail Runway Construction," gives specifications covering standard practice in monorail runway construction, including curves and tables.



SAFETY BRILL FEATURES

BRAKE RIGGING OF BRILL 79-E TRUCK

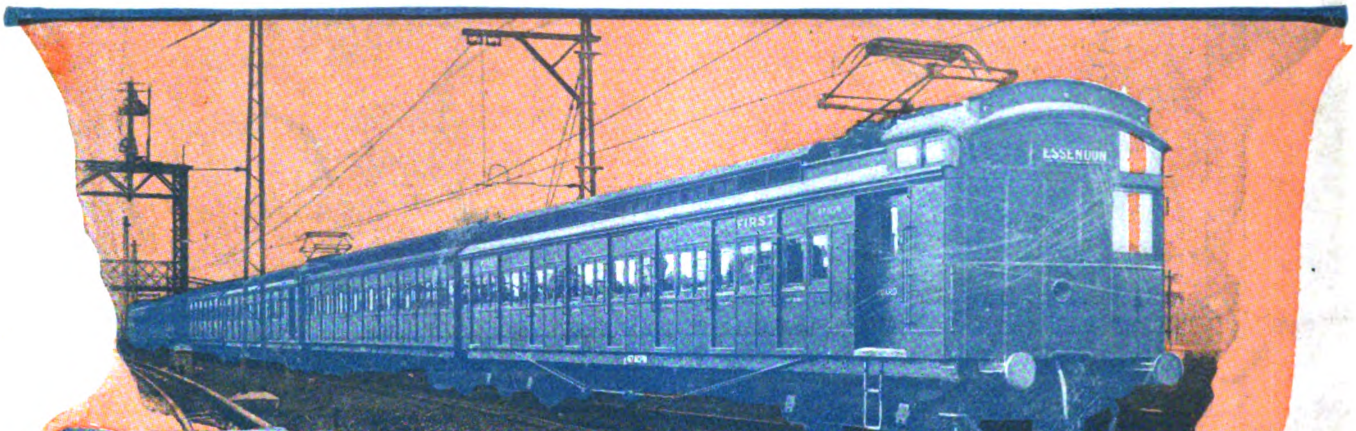
Arranged so that the dropping out of any or all of the brake pins in the foundation brake rigging of this Standard Birney Safety Car Truck will not cause the brakes to fail when needed, and result disastrously.

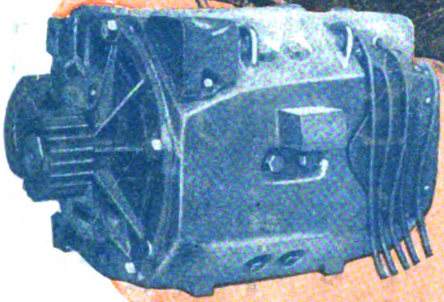
The bolts (indicated by arrows) on each side of each brake pin connecting the various parts to the brake pull lever (D) will hold the pull lever holder (C), bottom brake rod (F) and clevis (E), extending around the pull lever, in place should the connecting brake pin fail or drop out. Also the jaws of the pull lever holder and bottom brake rod are shortened, coming quickly in contact with the pull lever should the connecting pins drop out, and performing their functions properly. The pull lever holder is also connected to the brake beam (A) and is suspended from the truck crossing by the brake beam hanger (B).

Vertical cylinder levers connected by the clevis (E) and the dead horizontal lever are also equipped with these safety bolts.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

Health, housing and happiness—these three factors in the modern industrial life are dependent upon rapid transportation to counteract the evils of congestion.



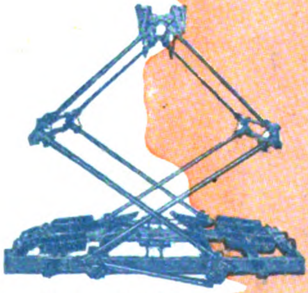


The World's Greatest Suburban Electrification

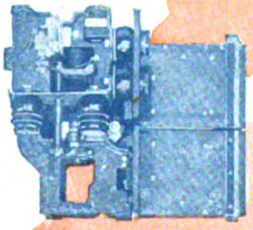
As long ago as 1896 the General Electric Company suggested the electrification of the many-miled steam rapid-transit systems of "Melbourne the Magnificent." But it was March 1913 before the contracts were placed by the State of Victoria, Australia.

With the experience of the world to draw from, Merz and McClellan, the engineers, recommended the installation of 1500 volts direct current and the use of G-E motor and control equipment for the 400 motor cars and 400 trailers to operate over 335 miles of single track. They found the high-tension direct current was the lowest in both first and continuing costs.

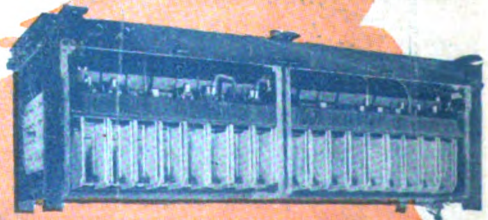
Electrification at Melbourne is making possible a great increase in the steam schedule range of 13 to 18 miles per hour, thus helping to sustain the reputation of this metropolis as a city without congestion.



Pantograph Sliding Trolley.



Line Breaker



Controller

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

25-94

McGraw-Hill Co., Inc. April 9, 1921 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

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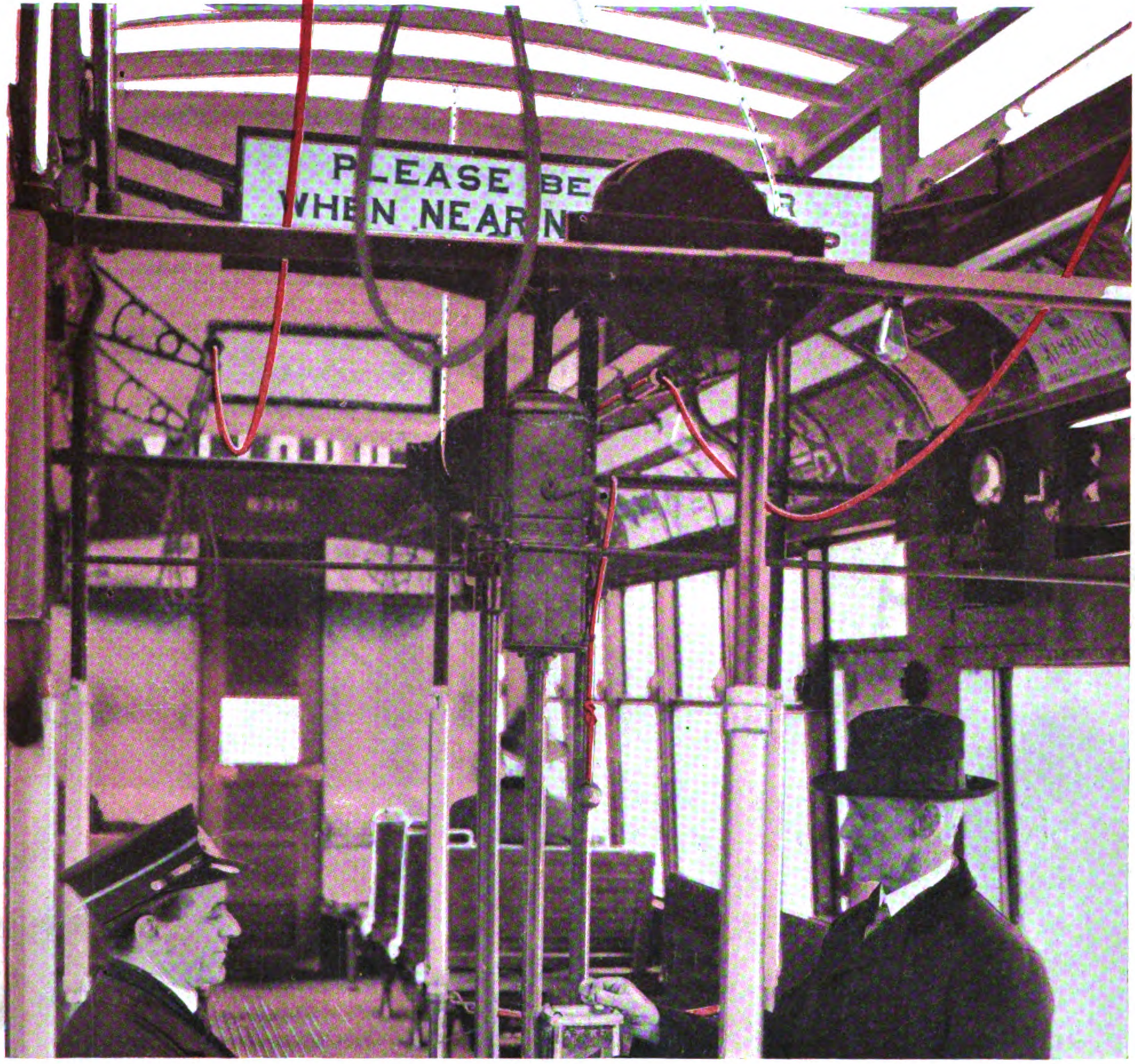

Unique in that the positions of trolley bases and trolley catchers are changed about, these center-entrance cars are not different from other types in regard to the use of Samson Spot Trolley Cord, Samson Register and Signal Cords.

The solid braided guard ropes used in place of chains to prevent passengers from crowding past the conductor is also a Samson product. The life of your cord is the real test of its durability and economy.

Samson Cordage Works - Boston, Mass.

Selection of Equipment

What are the best types of cars for modern electric railway passenger transportation in congested centers?

We believe that the best service may be provided and the highest economy obtained in most cities by the use of two types of cars, namely, Safety Cars and light double-truck cars.

Why not investigate this important problem before ordering additional equipment? Analyze the yearly economy of a light-weight, double-truck car. All know the economy of the Safety Car.

Westinghouse HL Control and quadruple No. 508, 25hp. motors on light-weight cars, will efficiently handle rush-hour traffic in two- or three-car trains and, at the same time, provide economical single-car service during all other periods.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse

McGraw-Hill Co., Inc. April 16, 1921 Twenty Cents Per Copy

Monthly Mechanical and Engineering Edition

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Permanent Track Construction a Reality

The RWB Dynamotor has accomplished for electric railways the seemingly impossible—permanent track construction. This has become a reality and future repair costs are cut to a minimum.

With this equipment rail joints and bonds are satisfactorily and economically welded, and worn rails and special manganese work built up. When not required for track work the equipment is used in the shops for welding shafts, gear cases, car wheels, etc.

The widespread and successful use of the RWB Dynamotor proves its tremendous value to every progressive electric railway.

RAIL WELDING AND BONDING COMPANY

Formerly the Lincoln Bonding Co.

Cleveland, Ohio

Electric Railway Operating Economy

What is really needed is a type of car that provides maximum economy during rush-hours, as well as capacity flexibility and economy during light-traffic periods.

Why adopt large, heavy cars and trailer operation for the maximum demand, and forego economy during the longer light-load periods?

Why use heavy cars, and saddle high-maintenance costs for ages on tracks, trucks and equipment,

When it is possible to secure light, double-truck cars for reliable and economical operation during non-rush hours as single cars, and for two- or three-car trains during rush hours, by equipping them with Westinghouse HL Multiple-Unit Control?

Westinghouse Electric & Manufacturing Company

East Pittsburgh, Pa.

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ELECTRIC RAILWAY JOURNAL

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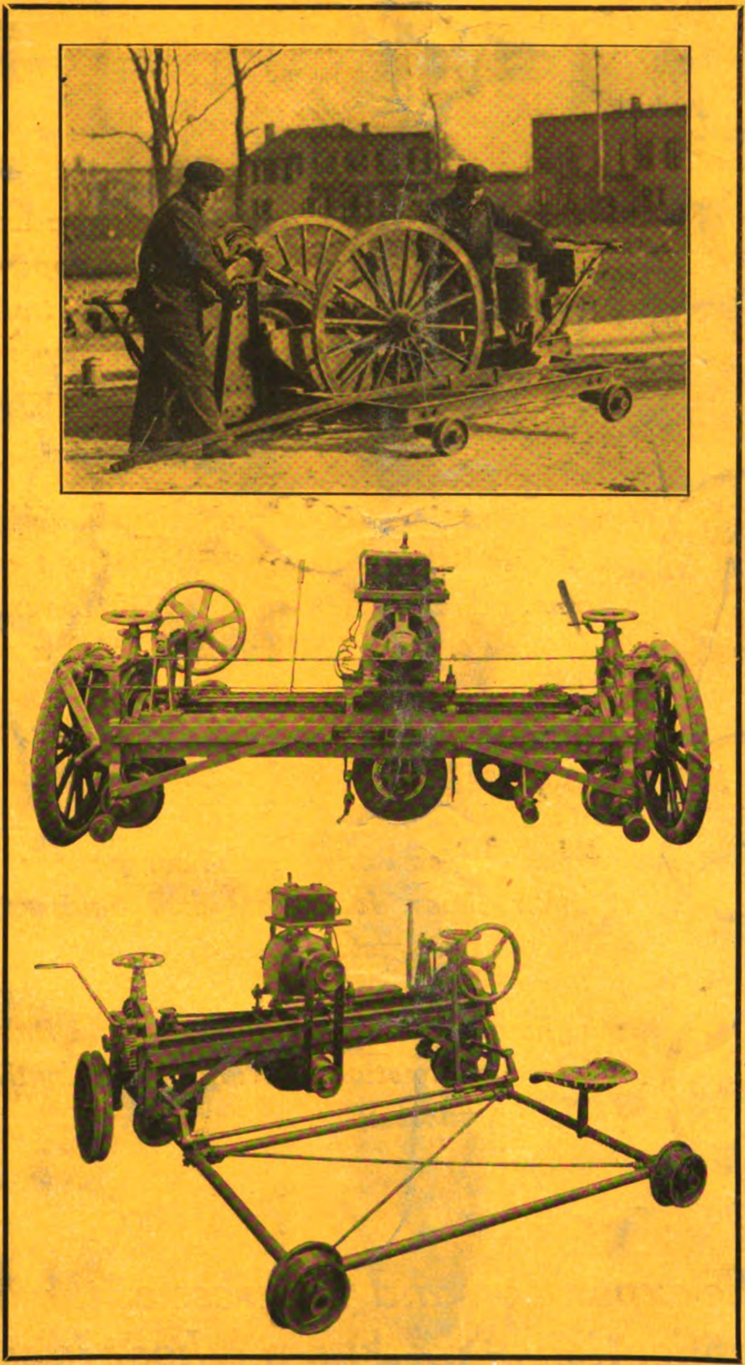

These Grinders
are used on
roads with
seven miles
of track and
on roads
with more than
a thousand
miles of track

Roads using
these grinders
operate
anywhere from
one grinder to
eighteen each
to keep
their rails in
good condition

These Rail Grinders are used in twenty different countries and in practically every State in the Union

Railway Track-work Co., Philadelphia

Commercialize Transportation

What solutions are there for the present electric railway transportation problems?

Weight reduction, as everyone knows, is an important factor in lowering maintenance and operating costs. Lighter cars equipped for multiple-unit train operation during rush hours will economically render that improved service which will attract more fares and increase revenue.

Wherever prosperous roads are found, freight-haulage usually constitutes an appreciable part of their net income. Transportation of freight offers the same advantage to many other roads, with a small initial investment.

Westinghouse No. 508, 25 hp. Motors and HL control on light-weight, double-truck cars operated in two- and three-car trains during rush-hour periods, and singly at other times, form the ideal equipment for the majority of congested cities.

Westinghouse freight-car equipment and Baldwin-Westinghouse Locomotives are largely used by these electric roads now successfully engaged in the transportation of freight.

For the expansion and progress of the industry the application of modern methods is essential.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

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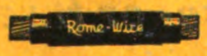
ROME WIRE

on Electrified Railways —

ROME WIRE will be found carrying the load required for the successful operation of trains and cars throughout the country.

A material part of this business is on "repeat orders"—proof that ROME Trolley Wire, Feed Wires and Cables have successfully stood the test of actual service under the most severe operating conditions.



Rome Wire Co. Rome N.Y.
"Diamond" Branch Buffalo N.Y.

Rome merit wins customers
Rome service holds them

WIRE ≡ ROME

Selection of Equipment

What are the best types of cars for modern electric railway passenger transportation in congested centers?

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Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse

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To
reduce overhead
maintenance costs
specify
ANACONDA
Trolley Wire

ANACONDA COPPER
MINING COMPANY
Rolling Mills Department

111 W. Washington St.
Chicago, Ill.

From Ore to Finished Product

ANACONDA
COPPER WIRE
W. J. Higgens

Some Reasons Why You Should Use

Westinghouse Repair Parts

WESTINGHOUSE ELECTRIC

When we recommend to railway operators the use of Westinghouse Repair Parts for restoring equipments to their original efficiency, it is with full confidence, because of the great care taken in the manufacture of Westinghouse Repair Parts.

WESTINGHOUSE ELECTRIC

When buying Westinghouse Repair Parts you receive parts made with special tools and by special mechanical processes especially developed and perfected by Westinghouse engineering and research specialists.

WESTINGHOUSE ELECTRIC

Westinghouse interests coincide with yours in that you are interested in procuring the best repair parts, and we are interested in making the best repair parts that advanced engineering, skilled workmanship and superior manufacturing facilities can produce.

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

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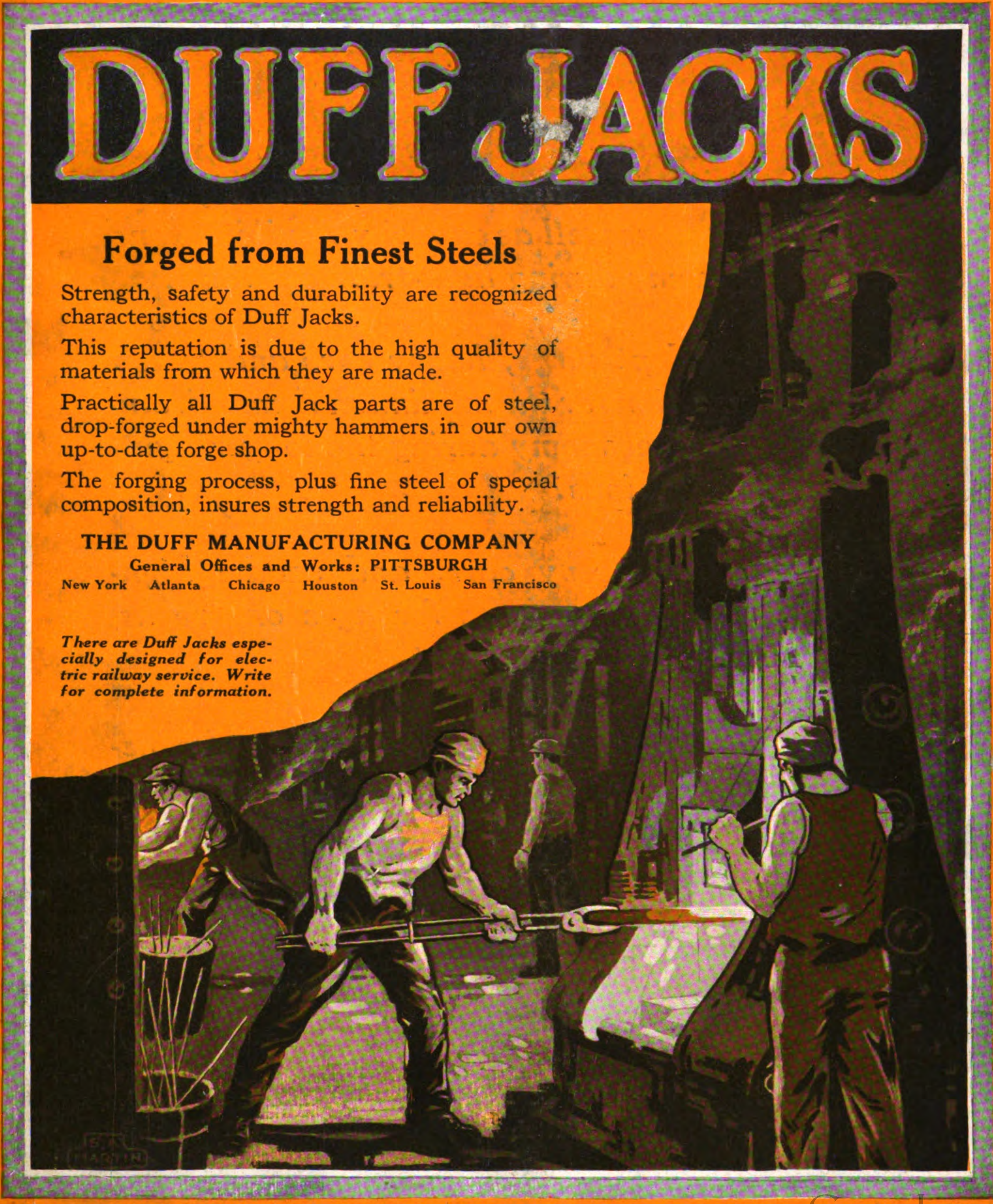

DUFF JACKS

Forged from Finest Steels

Strength, safety and durability are recognized characteristics of Duff Jacks.

This reputation is due to the high quality of materials from which they are made.

Practically all Duff Jack parts are of steel, drop-forged under mighty hammers in our own up-to-date forge shop.

The forging process, plus fine steel of special composition, insures strength and reliability.

THE DUFF MANUFACTURING COMPANY
General Offices and Works: PITTSBURGH
New York Atlanta Chicago Houston St. Louis San Francisco

There are Duff Jacks especially designed for electric railway service. Write for complete information.

Electric Railway Operating Economy

What is really needed is a type of car that provides maximum economy during rush-hours, as well as capacity flexibility and economy during light-traffic periods.

Why adopt large, heavy cars and trailer operation for the maximum demand, and forego economy during the longer light-load periods?

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Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

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Monthly Mechanical and Engineering Edition

ELECTRIC RAILWAY JOURNAL

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Who Uses Steel Twin Ties and Why

Saved $16573.60 per mile.
"The completed track showed a saving of $3.12 per single-track foot."—Mr. A. J. Stratton in The Electric Railway Journal.

Labor Costs Less With Steel Ties.
"Use of Steel Ties cuts down the amount of grading both in width and depth." —Mr. W. R. Dunham, Jr., in Maintenance of Way for Street Railways.

Track Laid in 1911 in Excellent Condition.
"There is difficulty now in finding these joints and not a single joint has given trouble." —Mr. A. S. Wolfe in The Electric Railway Journal.

Partial List of Cities in which Steel Twin Tie Track has been laid or is being laid this spring.

- New Haven, Conn.
- Harrisburg, Pa.
- Poughkeepsie, Pa
- Boston, Mass.
- Syracuse, N. Y.
- El Paso, Texas.
- Milwaukee, Wis.
- Baltimore, Md.
- Cleveland, O.
- Detroit, Mich.
- Highwood, Ill.
- Toledo, Ohio.
- Youngstown, O.
- Cincinnati, O.
- Jackson, Mich.
- Pueblo, Colo.
- Denver, Colo.
- Salt Lake City, Utah.
- Charlottesville, Va.
- Birmingham, Ala.
- Lexington, Ky.
- Louisville, Ky.

The International Steel Tie Company, Cleveland, O.

International Products:— STEEL TWIN TIES; STEEL CROSSING FOUNDATIONS; and STEEL PAVING GUARD; are manufactured and sold for us in Canada by The Sarnia Bridge Co. Ltd. Sarnia, Ont.

Commercialize Transportation

What solutions are there for the present electric railway transportation problems?

Weight reduction, as everyone knows, is an important factor in lowering maintenance and operating costs. Lighter cars equipped for multiple-unit train operation during rush hours will economically render that improved service which will attract more fares and increase revenue.

Wherever prosperous roads are found freight-haulage usually constitutes an appreciable part of their net income. Transportation of freight offers the same advantage to many other roads, with a small initial investment.

Westinghouse No. 508, 25 hp. Motors and HL control on light-weight, double-track cars operated in two- and three-car trains during rush-hour periods, and singly at other times, form the ideal equipment for the majority of congested cities.

Westinghouse freight-car equipment and Baldwin-Westinghouse Locomotives are largely used by these electric roads now successfully engaged in the transportation of freight.

For the expansion and progress of the industry the application of modern methods is essential.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

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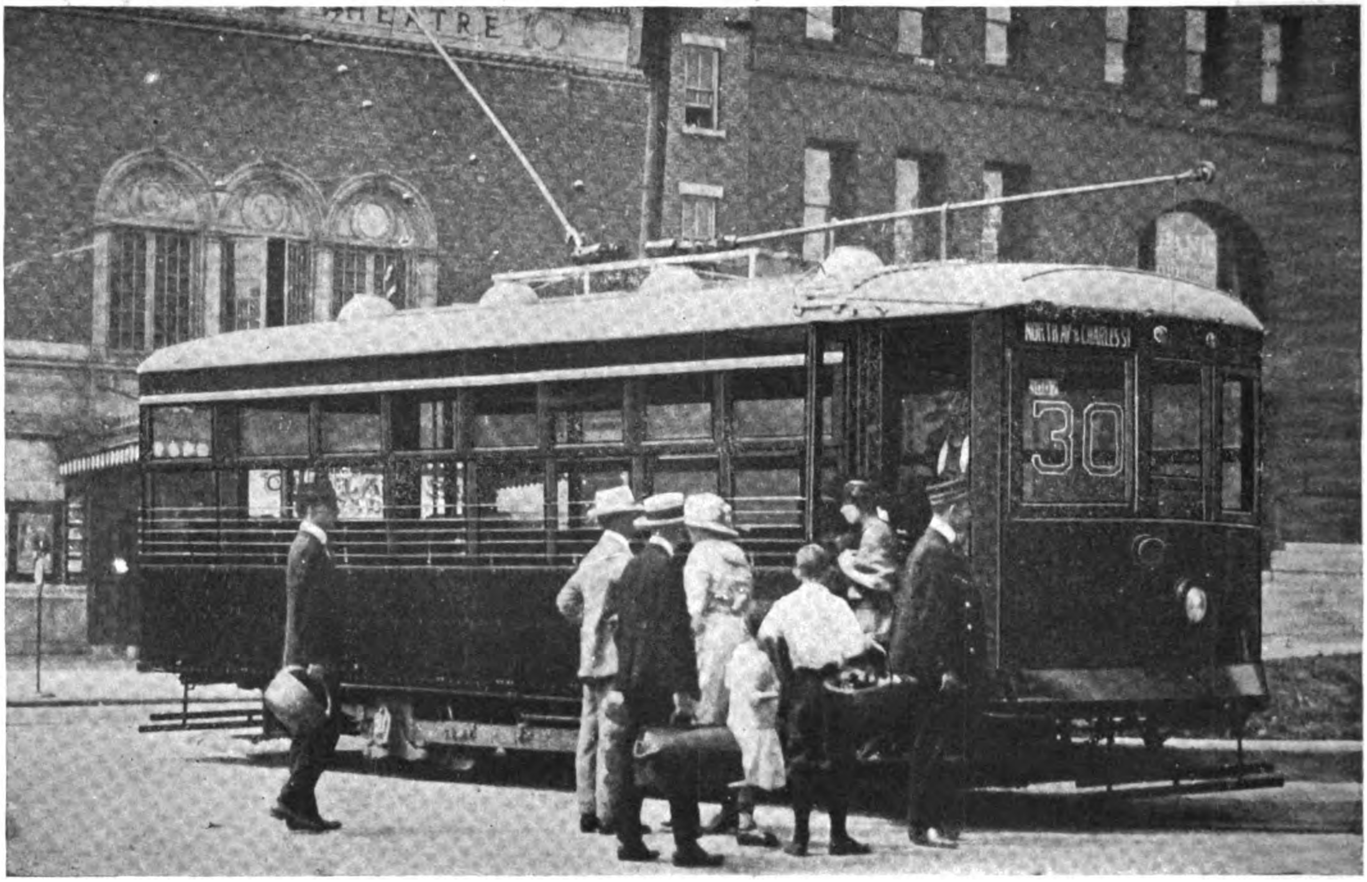
OKONITE

WASHINGTON, BALTIMORE & ANNAPOLIS RAILROAD

OKONITE Wire Installed 1917 Washington to Baltimore



Don't Overlook the Value of the Safety Car

When national emergency demanded maximum efficiency of the country's transportation system, standard safety cars were used.

Where railway operating economy has been effected, safety cars will generally be found in service.

With the safety car many roads have recovered the good will of the public, and transformed loss into profit.

Why not consider the initial investment for safety cars entirely upon a basis of what they will earn during the coming busy summer season.

Specify Westinghouse No. 508-A Motors and Control for all Standard Safety Cars

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Westinghouse

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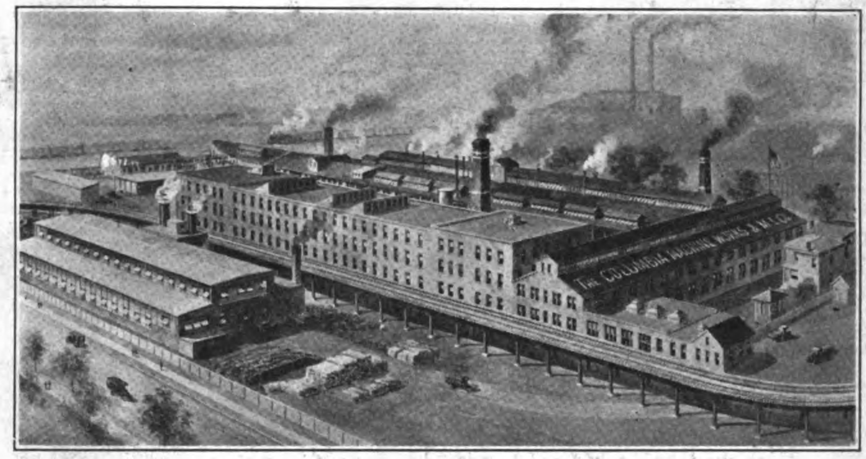
T.P.B

THIS SHOP IS YOURS


THE COLUMBIA MACHINE WORKS & M. I. CO.

THIS shop has grown to its present size largely by service to the electric railway industry. Columbia reputation for good work, reliable service and fair prices has kept electric railway work coming to us in a volume that has increased year by year.

There are many pieces of equipment that a road can produce more economically in this shop than in its own. Send your blueprints and get a quotation from your Columbia Shop. We are geared for speed, economy and reliable work.

Prices and deliveries are exceptionally favorable now. An immediate inquiry will show you advantageous conditions.

Ready for delivery are the Columbia Electric Railway Specialties named below.

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders & brush-holder springs
- Brake, door and other handles
- Brake forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resisters
- Third-rail shoe beams & accessories
- Trolley poles (steel) and wheels

THE COLUMBIA
MACHINE WORKS
& MALLEABLE IRON
COMPANY

Atlantic Avenue and Chestnut Street,
Brooklyn, N. Y.

A. A. GREEN, Sales Mgr., 50 Church St., New York.
ERNEST KELLER, Brooklyn, N. Y.
E. ALLISON THORNWELL, Atlantic Trust Bldg., Atlanta.
J. L. WHITTAKER, 141 Milk St., Boston.
F. F. BODLER, Monadnock Bldg., San Francisco.
W. McK. WHITE, 343 South Dearborn St., Chicago.

TOOLS

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

Operating Insurance

On Westinghouse Railway Motors and Control

Westinghouse Renewal Parts in your store room insure quick renewal and the return of equipment to service with minimum delay.

When you pause and think it over, it will surely be shown that the small investment in a stock of reliable renewal parts is insignificant compared to the loss caused by cars held out of service waiting for repairs.

Why not be fair with your master mechanic and help him keep the cars in first-class condition? This can be insured only when you order Westinghouse Renewal Parts for Westinghouse Equipment.

Why not keep the equipment standard and insure continued interest from the manufacturer who designed and supplied the original equipment?

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

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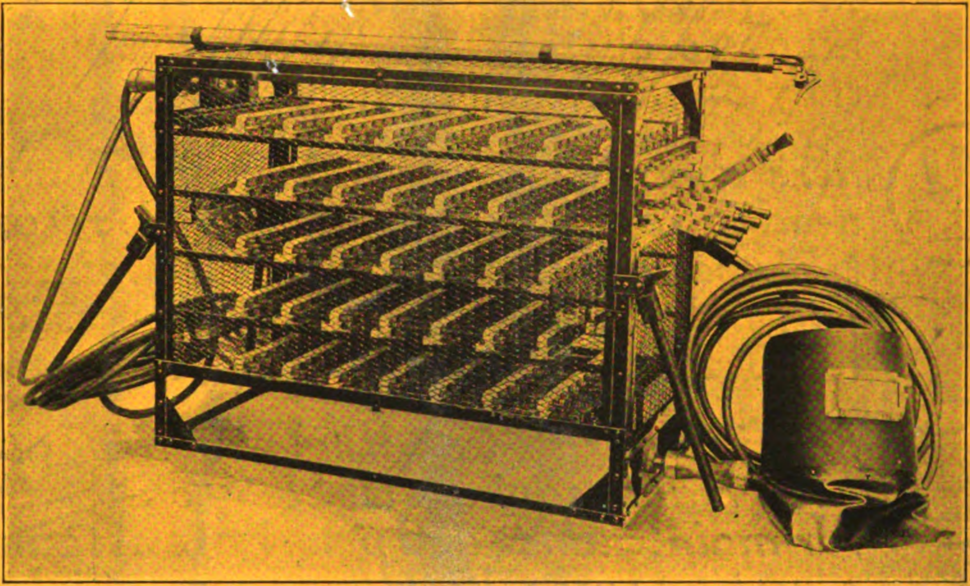

INTRODUCING

"AJAX"

Electric Arc Welder

Now offered after having demonstrated by three years of service that it is capable of safeguarding the reputation made by our Reciprocating, Universal and Atlas rail grinders. Among the features that will especially appeal to electric railway men are:

Portability—Weighs only 120 lbs., is 18 in. wide, 36 in. long by 28 in. high. Convenient hinged carrying handles. Can be transported on any car platform.

High Amperage means deep penetration — 333 amp. at 600 volts, 209 amp. at 250 volts. Practically 50% higher capacity than any other resistance machine on the market, ample for good welding under all ordinary conditions. Good also for carbon arc welding.

Accessibility—All parts easy to get at, all circuits plainly traceable, all repairs easy to make with unskilled labor.

Completeness—Equipment includes everything necessary to start work—no extras to buy. Even the face shield, trolley pole, cables and welding handle are included.

We are staking our reputation on the satisfactory performance of these machines. Write us for complete details and prices.

Railway Track-work Company, Philadelphia, Pa.

Learn More About Operating Costs

While many railways are alert to the possibilities of renewing old motors with modern parts, a more thorough analysis will show that many motors now in use can never be made to operate efficiently, simply because they are worn out.

Where a large number of old motors must be used in regular service, accurate records of their performance and cost for maintenance will show which motors should be used least of all and which ones should be first replaced.

Where investigations of this kind have already been made, savings of 25% to 30% in cost for maintenance and power are obtained, by diverting cars with old motors to light-duty service, and using the more modern makes for heavy-duty requirements.

Westinghouse Railway Engineers are ready to help check your service. The use of Westinghouse standard modern motors is a big item in reducing operating costs.

The small expense for an analysis will prove highly profitable.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

McGraw-Hill Co., Inc. *Monthly Mechanical and Engineering Edition* June 18, 1921

ELECTRIC RAILWAY JOURNAL

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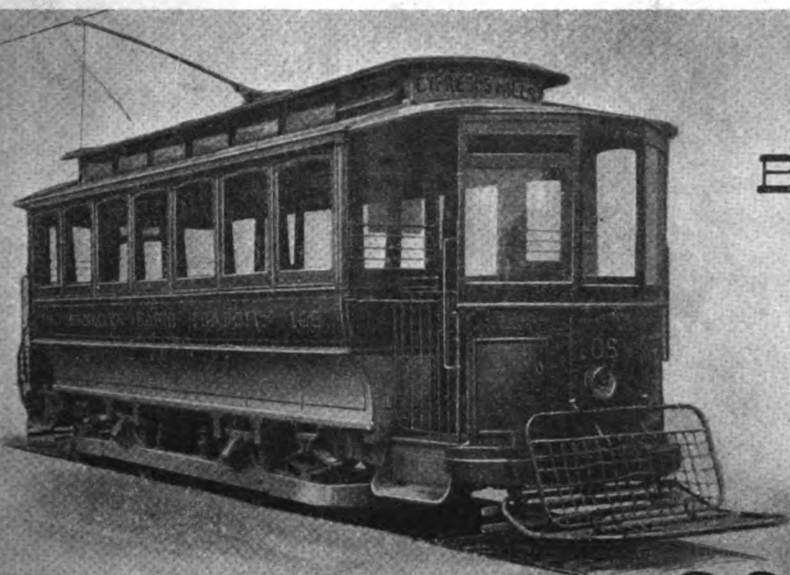
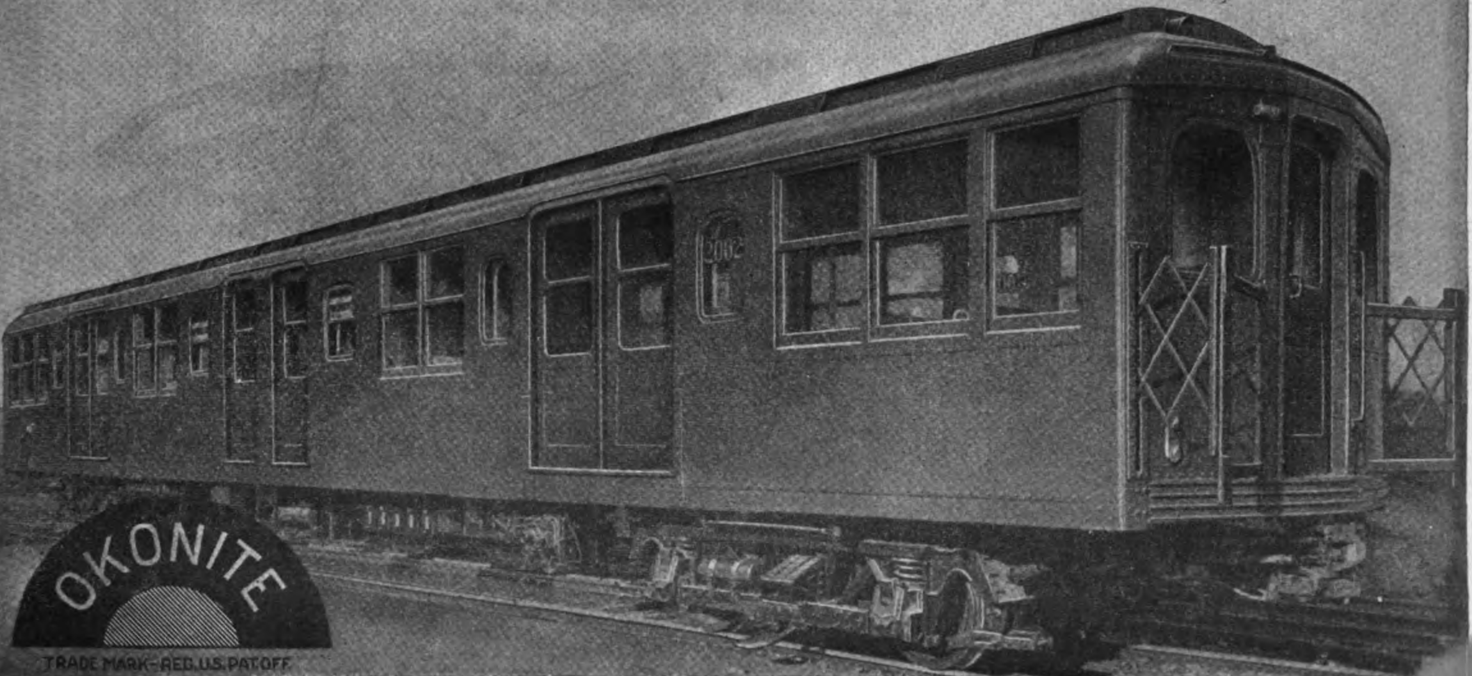


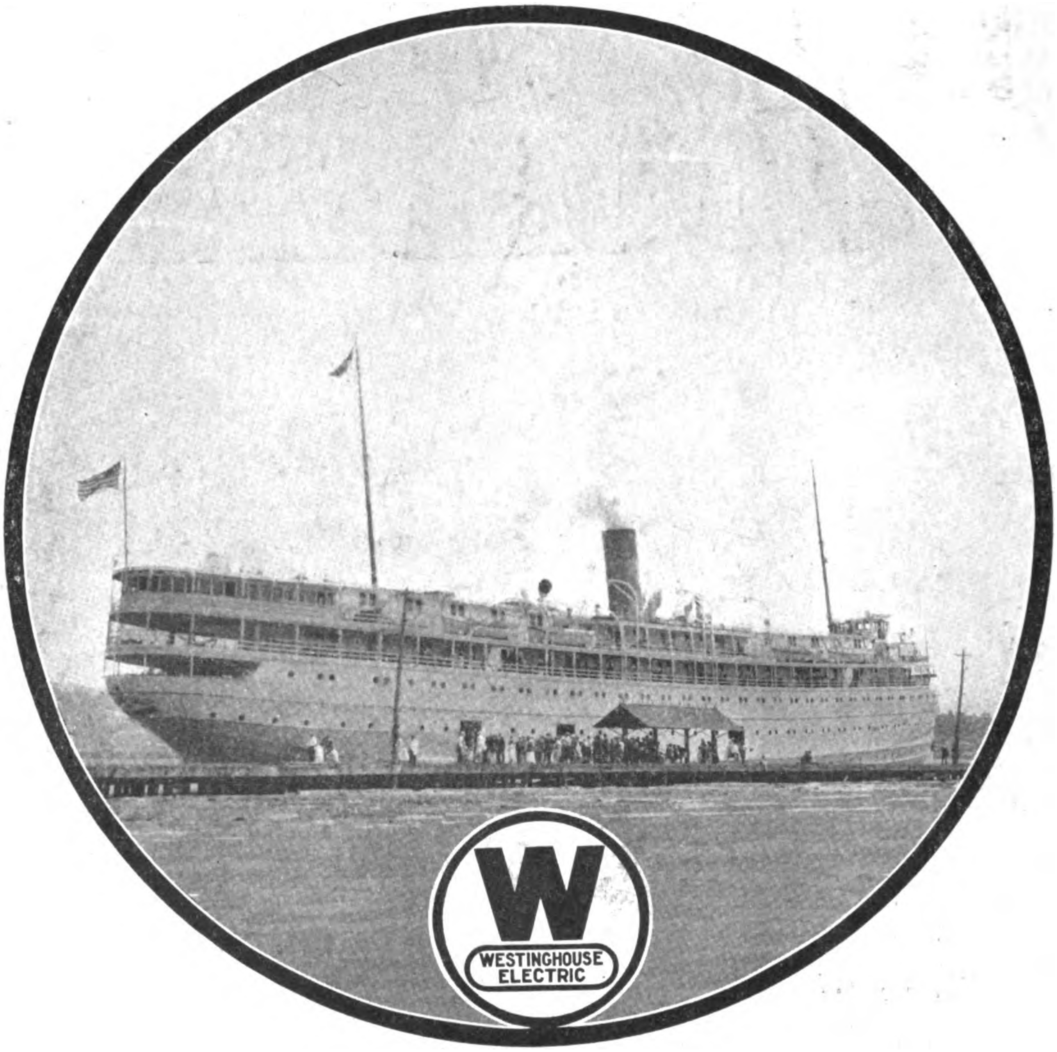
BROOKLYN RAPID
TRANSIT

FOR OVER 20 YEARS
OKONITE
HAS GIVEN PERFECT SATISFACTION ON THIS ROAD

More than 90%
of the Cars are wired with OKONITE



OKONITE
TRADE MARK—REG.U.S.PAT.OFF.



All Aboard!

For Better Times

THE CENTRAL ELECTRIC RAILWAY ASSOCIATION will assemble on board the good ship "South American" June 26th to July 1st for a trip around the Great Lakes where, undisturbed, they will consult with each other and plan for the future.

The times demand greater economies in operation and greater enterprise in meeting and satisfying the public.

The leaders in this progressive Association will tell the others about increased revenue enjoyed since they established Electric Railway Freight Haulage with Baldwin-Westinghouse electric locomotives. Example after example will be mentioned about the great economy and reliability of Westinghouse automatic sub-stations, and safety cars with No. 508 motors.

Don't Fail to Attend

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

McGraw-Hill Co. June 25, 1921 Twenty Cents Per Copy

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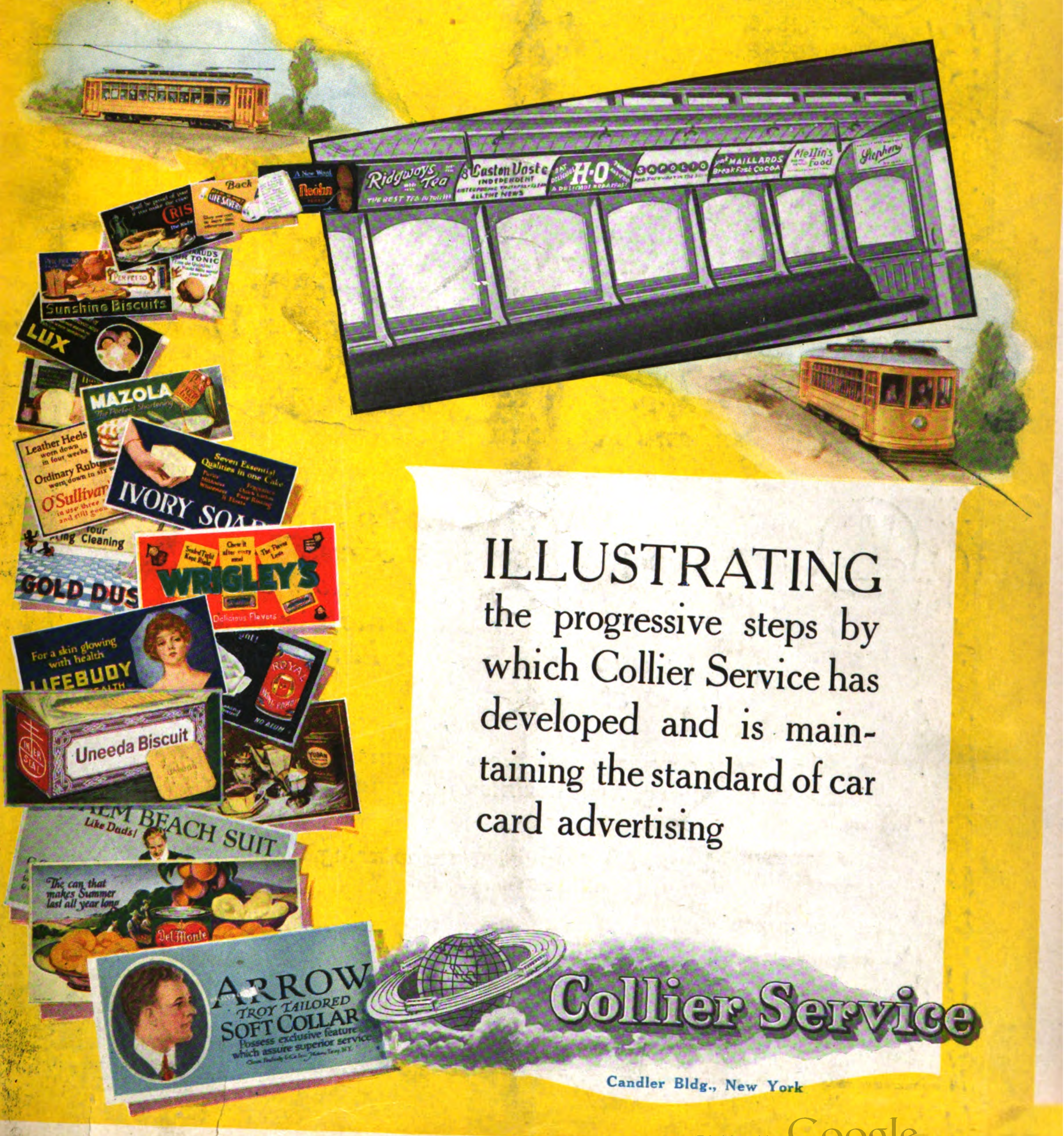
ELECTRIC RAILWAY JOURNAL


Ridgways Tea
Euston Uoste Independent
H-O
Sapolio
Maillards Breakfast Cocoa
Mellin's Food
Sunshine Biscuits
LUX
MAZOLA
O'Sullivan
IVORY SOAP
GOLD DUST
WRIGLEY'S
LIFEBUOY
Uneeda Biscuit
PALM BEACH SUIT
Del Monte
ARROW TROY TAILORED SOFT COLLAR

ILLUSTRATING
the progressive steps by which Collier Service has developed and is maintaining the standard of car card advertising

Collier Service

Candler Bldg., New York

Systematic Replacement

While overhauling your rolling stock it is very important to determine whether the old motor equipments that are still in service have reached the limit of their economic life.

Where maintenance costs are kept the records will show at once which motors it will pay to rebuild and which motors should be replaced.

When cars are retained in service with old motor equipments that are beyond renewal, they become not only revenue consumers, but interfere with the regular operating schedules of cars having modern, efficient motor equipments, and thus cause dissatisfaction to the public in general.

Westinghouse No. 508, 25 hp., and No. 514, 40 hp., motors, now in successful operation throughout the country, have sufficient capacities to replace older motors of similar capacity and will show a handsome return on the investment.

Practical railway economy and the development of public good will justify the elimination of high maintenance and unreliable equipment.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Vol. 57, No. 26 New York, June 25, 1921 ***Pages* 1155-1192**

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors **Henry H. Norris, Managing-Editor**

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The experimental Richmond trolley bus operates in conjunction with rail service to demonstrate its worth and flexibility and to compare costs of operation under like circumstances. Details as to construction of the bus compare favorably with the modern one-man car....................................Page 1158

Merchandising Transportation

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Operating Details of the Motor Bus Route in Akron

A non-competitive route, operated in connection with the housing development, proves that the motor bus can be operated successfully as an auxiliary when proper service is given and reasonable fares are charged...........Page 1164

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McGRAW-HILL COMPANY, INC., Tenth Ave. at 36th St., NEW YORK

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Journal of Electricity and Western Industry
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Power Coal Age

The annual subscription rate is $4. Extra zone postage west of the Mississippi, and in Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba, Mexico, Honduras, Nicaragua, Peru, Colombia, Bolivia and Shanghai, China, 50 cents. Extra postage in Canada, $1.50. Extra foreign postage, $3 (total $7, or 29 shillings). Single copy 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given. Notice must be received at least ten days before the change takes place.

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Member Associated Business Papers, Inc.

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Advertising Index—Alphabetical, 50; Classified, 44, 46, 48; Searchlight Section, 42-43

Solving
The
Interurban
Problem—

W
WESTINGHOUSE ELECTRIC

One of the Missouri & Kansas Railway Automatic Substations

The substation operator, on a basis of work done, is the highest paid man on the suburban railway. His salary, when taken together with equipment costs and upkeep, presents an international interurban railway problem.

An effective solution of this problem was recently obtained by Missouri & Kansas Railway men cooperating with Westinghouse engineers, and their foresight has shown the way for every interurban railway to *reduce operating expenses* and *increase efficiency.*

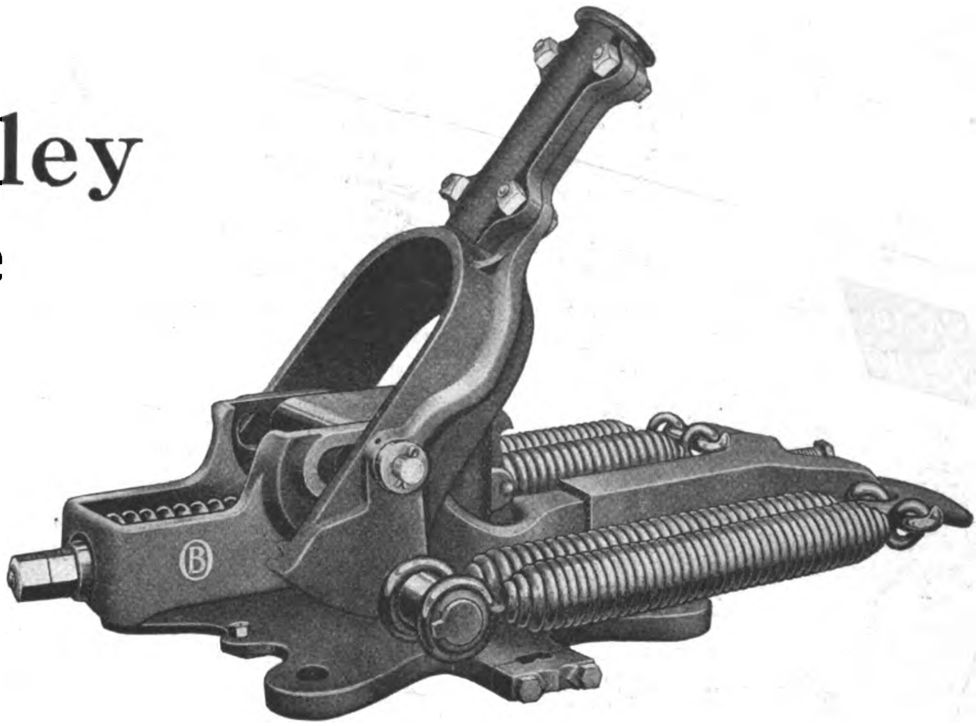
Two Westinghouse *automatic* substations on this line are now handling a daily load with exceptional ease and with absolutely no attention except an occasional inspection. Although extremely simple in design, these stations are highly efficient.

Let Us Solve Your Problem

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.
Offices in all Principal American Cities

Westinghouse
Automatic Substations

O-B Trolley Base



O-B Base—Form 1—Patented

Gives You the Pressure You Want On High Wire and Low

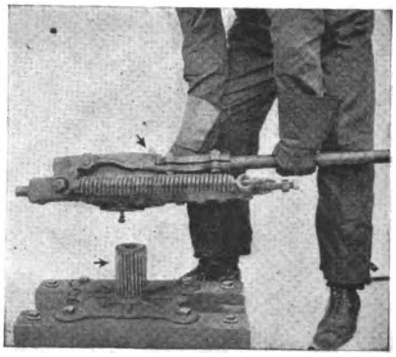
You know what pressure you need on the trolley wire. Set the O-B Trolley Base for it.

It will give you a practically uniform pressure from under the roof hook to an almost vertical pole position. Always you get enough to hold wheel to wire—never undue, destructive pressure.

Especially is this uniform pressure desirable in the horizontal pole position, as it keeps the pole from jumping free of the roof hook.

O-B Base has several other worth-while characteristics. It has strength to spare for hard service. It is easy to take care of because it is accessible and simple. All bearings have renewable bushings—for a little money an old O-B Base can be made new again.

O-B Bases are absolutely interchangeable—repair parts always fit.



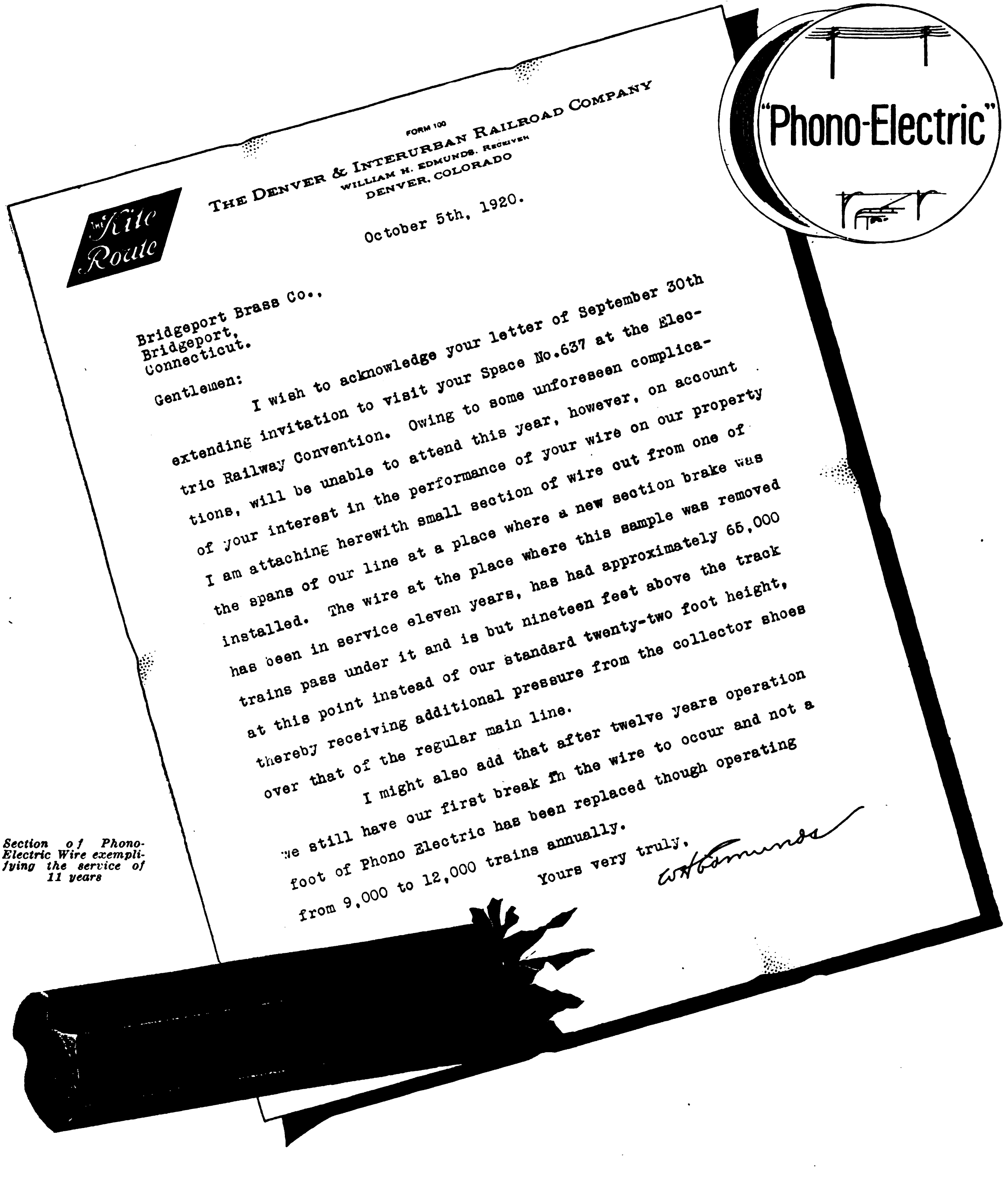
One man lifts the base off the stem and exposes all the vital parts.

Notice, particularly, the hook-down feature and the caged roller bearings.

The Ohio Brass Company, Mansfield, Ohio

Manufactures: **Trolley Materials; Rail Bonds; High Tension Porcelain Insulators; Third Rail Insulators; Electric Railway Car Equipment.**

New York, Philadelphia, Pittsburgh, Chicago, Los Angeles, San Francisco, Paris, France



FORM 100
THE DENVER & INTERURBAN RAILROAD COMPANY
WILLIAM H. EDMUNDS, RECEIVER
DENVER, COLORADO

The Kite Route

October 5th, 1920.

Bridgeport Brass Co.,
Bridgeport,
Connecticut.

Gentlemen:

I wish to acknowledge your letter of September 30th extending invitation to visit your Space No.637 at the Electric Railway Convention. Owing to some unforeseen complications, will be unable to attend this year, however, on account of your interest in the performance of your wire on our property I am attaching herewith small section of wire cut from one of the spans of our line at a place where a new section brake was installed. The wire at the place where this sample was removed has been in service eleven years, has had approximately 65,000 trains pass under it and is but nineteen feet above the track at this point instead of our standard twenty-two foot height, thereby receiving additional pressure from the collector shoes over that of the regular main line.

I might also add that after twelve years operation we still have our first break in the wire to occur and not a foot of Phono Electric has been replaced though operating from 9,000 to 12,000 trains annually.

Yours very truly,

W H Edmunds

Section of Phono-Electric Wire exemplifying the service of 11 years

Phono-Electric Trolley Wire Gives Satisfactory Service Everywhere

Bridgeport Brass Company

Bridgeport **Connecticut**

2277

What 109 to 2851 means to you

The curve shown on this page indicates the average number of Steel Twin Ties to each order for the last ten years.

Its steep and rapid ascent from 109 ties in 1911 to 2,851 in the first half of 1921 is ample evidence of the wide spread approval by track engineers of Steel Twin Tie Track.

The dollars and cents reason is the strongest for the use of this type of track in paved streets. Its first and final cost is lower than conventional types with wood ties. It economizes in grading; in concrete; in labor.

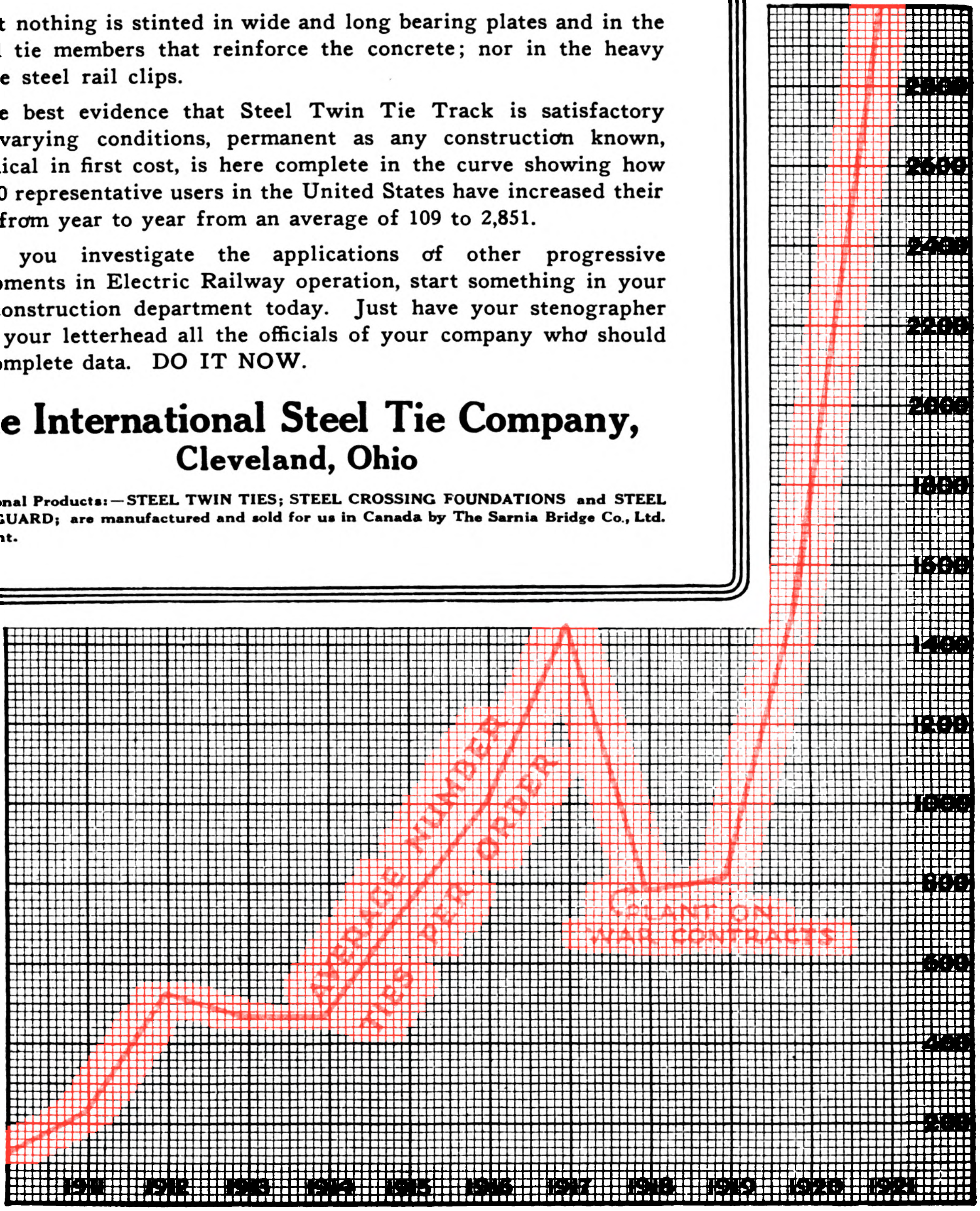
But nothing is stinted in wide and long bearing plates and in the channel tie members that reinforce the concrete; nor in the heavy jaw-type steel rail clips.

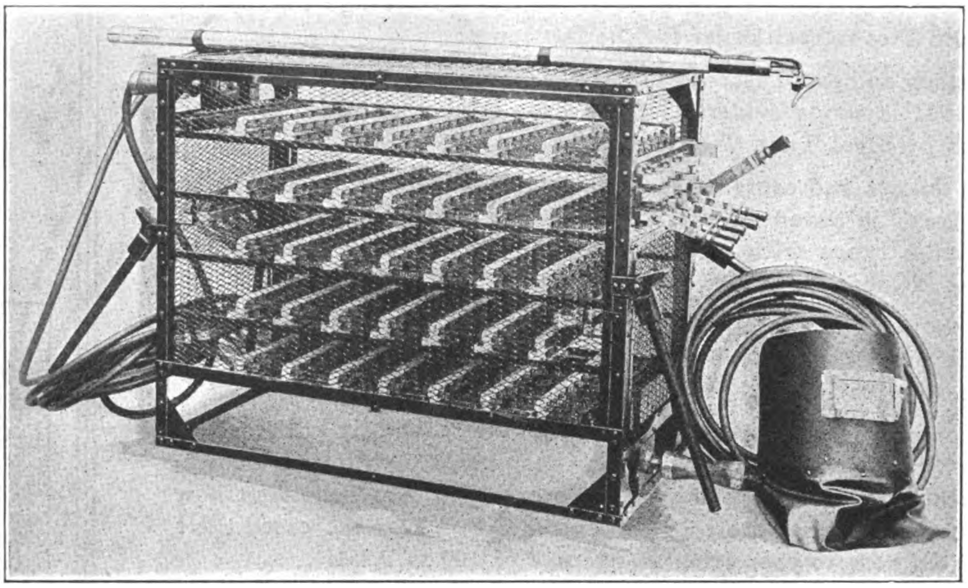
The best evidence that Steel Twin Tie Track is satisfactory under varying conditions, permanent as any construction known, economical in first cost, is here complete in the curve showing how over 100 representative users in the United States have increased their orders from year to year from an average of 109 to 2,851.

As you investigate the applications of other progressive developments in Electric Railway operation, start something in your track construction department today. Just have your stenographer list on your letterhead all the officials of your company who should have complete data. DO IT NOW.

The International Steel Tie Company,
Cleveland, Ohio

International Products:—STEEL TWIN TIES; STEEL CROSSING FOUNDATIONS and STEEL PAVING GUARD; are manufactured and sold for us in Canada by The Sarnia Bridge Co., Ltd. Sarnia, Ont.





INTRODUCING

"AJAX"

Electric Arc Welder

Now offered after having demonstrated by three years of service that it is capable of safeguarding the reputation made by our Reciprocating, Universal and Atlas rail grinders. Among the features that will especially appeal to electric railway men are:

Portability—Weighs only 120 lbs. is 18 in. wide, 36 in. long by 28 in, high. Convenient hinged carrying handles. Can be transported on any car platform.

High Amperage means deep penetration—333 amp. at 600 volts, 209 amp. at 250 volts. Practically 50% higher capacity than any other resistance machine on the market, ample for good welding under all ordinary conditions. Good also for carbon arc welding.

Accessibility—All parts easy to get at, all circuits plainly traceable, all repairs easy to make with unskilled labor.

Completeness—Equipment includes everything necessary to start work—no extras to buy. Even the face shield, trolley pole, cables and welding handle are included.

We are staking our reputation on the satisfactory performance of these machines. Write us for complete details and prices.

Railway Track-work Company, Philadelphia, Pa.

IMPORTANT

We claim that "Golden Glow" reflectors are not only by far the best, the most efficient and the most permanent reflectors at the present time offered for railway headlight service, but also that on account of the specially developed processes and machinery used in their manufacture they are the only accurately made, ground and polished parabolic glass reflectors on the market that can be manufactured and sold at a commercial price.

No headlight is a real headlight unless it has a **real** reflector. The headlight case is simply a container for the reflector.

When you buy headlights—buy the reflectors. Buy Golden Glow Headlights and get the best headlights at a reasonable first cost.

Write for Catalog Sheets

Type T Golden Glow Headlight, 9-in. Reflector for city and suburban service.

Type T Golden Glow Headlight, 12-in. Reflector for ordinary interurban service.

Type T Golden Glow Headlight, 14-in. Reflector for high speed interurban service

ELECTRIC SERVICE SUPPLIES CO.

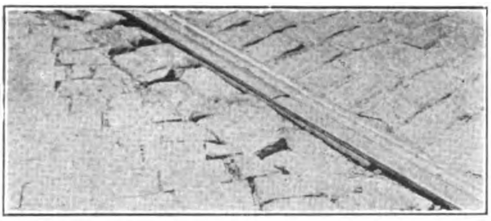
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

CHICAGO
Monadnock Building

Branch Offices: Boston, Scranton, Pittsburgh Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto



Typical loose condition of pavement as result of cupped mechanical joint.

Thermit Insert Weld installed in street. Joint and pavement troubles eliminated.

Cause and Prevention

The continual pounding of car wheels on mechanical or partially welded joints soon causes the joints either to shake loose or break.

The loosening or breakage of the joints causes the car wheels to pound them all the more, which in turn causes cupping.

The cupping of the rail joint causes the rails to loosen all the more.

The loosening of the rails at this point causes water to seep in.

The seeping in of water causes the pavement to loosen up, in the manner shown in the illustration.

The loosening of the pavement causes necessity for making premature and frequent pavement renewals.

Loose and cupped rail joints cause the joint to be pounded to pieces.

The deterioration of the joint shortens the life of the rail.

Frequent renewals of short lived rails.

The frequent pavement renewals cause an excessive leak in your track maintenance expense

THERMIT INSERT RAIL WELDS

Prevent all these things

The superheated liquid steel produced by the Thermit reaction effects a pure butt weld on each side of a white hot insert of the same analysis to that of the rail is placed between the rail heads.

After grinding, the result is a continuous surface of rail with the joint absolutely eliminated.

The elimination of the joint prevents cupping or breakage.

The prevention of cupping or breakage prevents frequent rail renewals and absolutely eliminates maintenance during the life of the rail.

Send for our latest Rail Welding Pamphlet 3932.

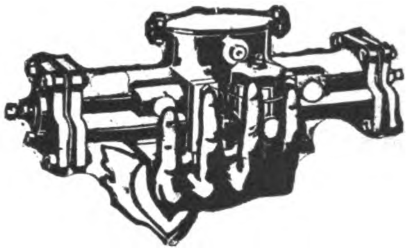
METAL & THERMIT CORPORATION

Boston
Chicago
Pittsburgh

120 Broadway New York

Toronto
South San Francisco

Modernize! *Pneumatize!*



For Better Horizontal Transportation

You don't see many of those old-time rope cable elevators nowadays, do you?

The control devices of the modern elevator leave little more for the operator's attention than the safety of passengers and accuracy of stops.

If such improvements have been found desirable in *vertical, fare-less* transportation, how much more desirable it is to minimize manual labor in *horizontal* transportation in which the need for safety and speed must be taken in connection with the further need for collecting a fare from each and every rider.

Having studied this problem in every detail we will be pleased to confer with you as to which of the following will best enable you to get more car-miles per hour and more money per car-mile at a decrease in both labor and accident cost.

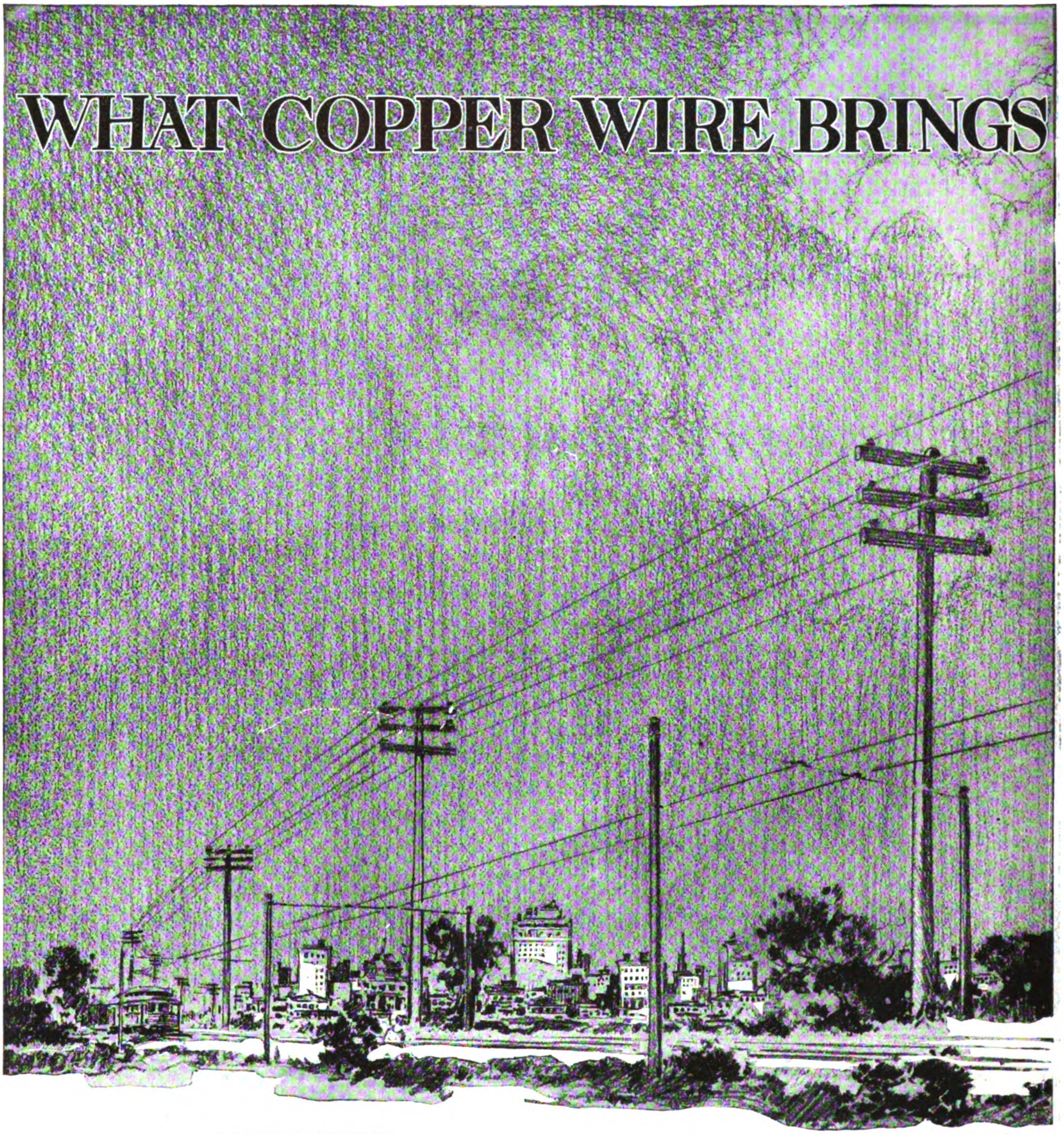
National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

Which can be adapted in whole or part to make your cars embody the last words in fastest, safest, most economical operation.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.



COPPER PRODUCTS

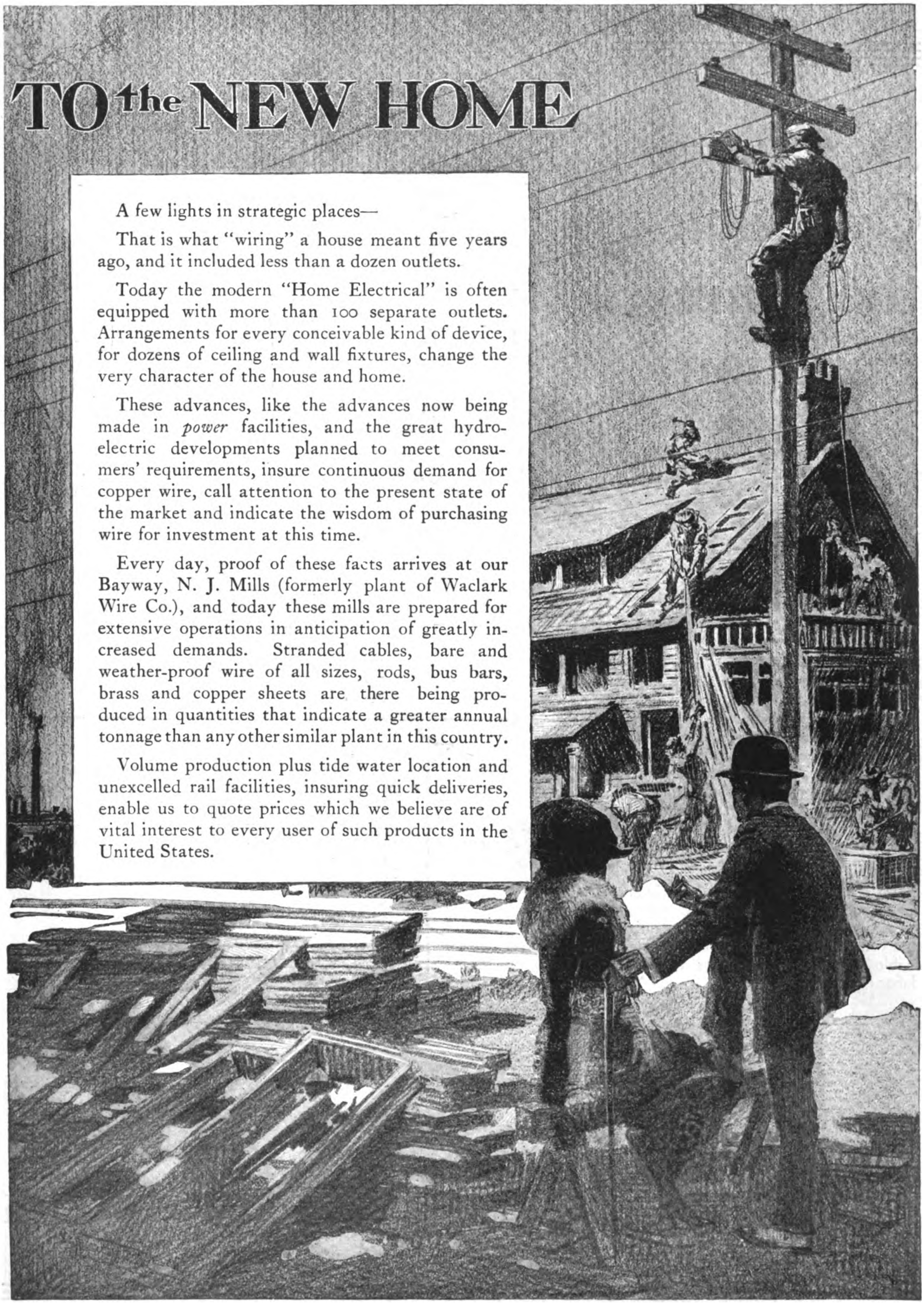
- *Round Bare Wire*
- *Bare Strand*
- *Trolley Wire—Round and Shaped*
- *Flat and Square Bare Wire*
- *Tinned Wire and Strand*
- *Weather-proof Wire and Strand*
- *Slow-burning Wire and Strand*
- *Bus Bars*
- *Copper in Rolls*
- *Rolled Rods*
- *Drawn Rods—Round, Square and Rectangular*

BRASS AND BRONZE PRODUCTS

- *Brass and Bronze Sheets*
- *Brass and Bronze Round Wire*
- *Brass and Bronze Flat and Square Wire*

Mills, Bayway, N. J.

AMERICAN COPPER PRODUCTS
CORPORATION
200 BROADWAY NEW YORK



TO the NEW HOME

A few lights in strategic places—

That is what "wiring" a house meant five years ago, and it included less than a dozen outlets.

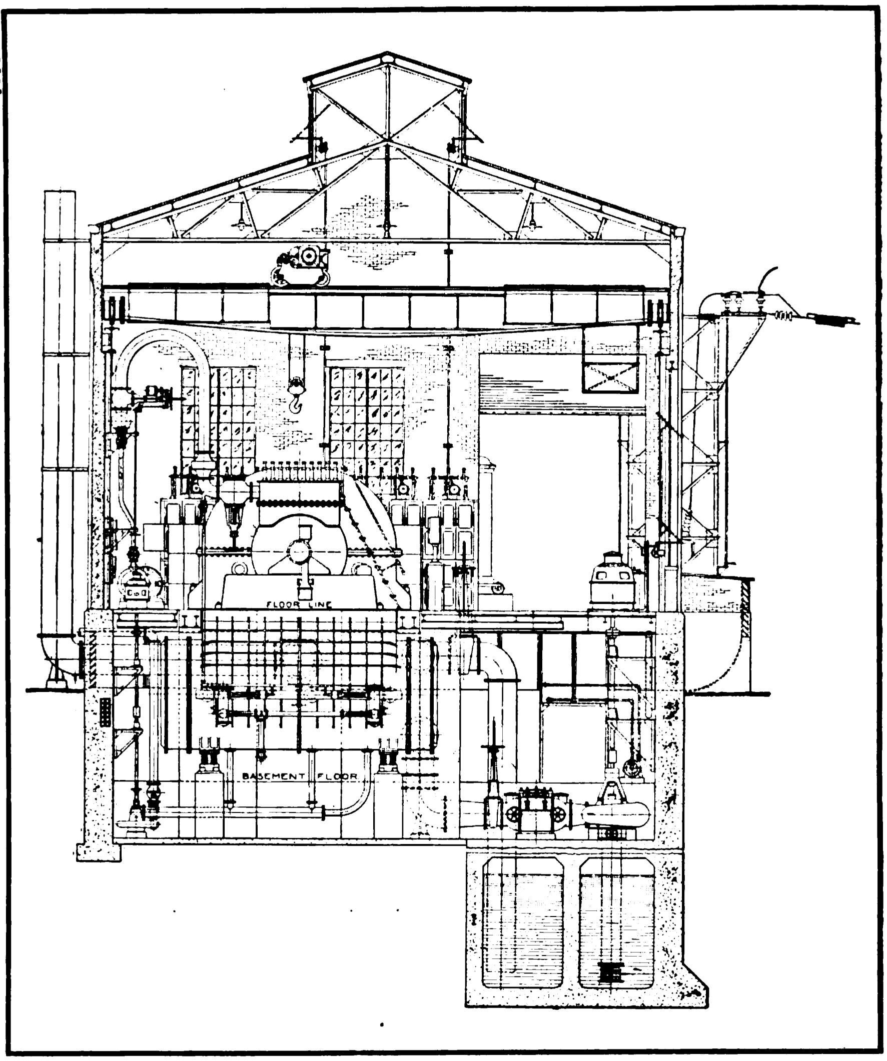
Today the modern "Home Electrical" is often equipped with more than 100 separate outlets. Arrangements for every conceivable kind of device, for dozens of ceiling and wall fixtures, change the very character of the house and home.

These advances, like the advances now being made in *power* facilities, and the great hydro-electric developments planned to meet consumers' requirements, insure continuous demand for copper wire, call attention to the present state of the market and indicate the wisdom of purchasing wire for investment at this time.

Every day, proof of these facts arrives at our Bayway, N. J. Mills (formerly plant of Waclark Wire Co.), and today these mills are prepared for extensive operations in anticipation of greatly increased demands. Stranded cables, bare and weather-proof wire of all sizes, rods, bus bars, brass and copper sheets are there being produced in quantities that indicate a greater annual tonnage than any other similar plant in this country.

Volume production plus tide water location and unexcelled rail facilities, insuring quick deliveries, enable us to quote prices which we believe are of vital interest to every user of such products in the United States.

Don't Overlook the Main Function of the Power Plant



The one essential of the power plant is to supply electrical energy at the lowest possible cost.

A careful assembly of highest grade equipment in Unit Power Plant design insures lowest investment per kilowatt of capacity and requires a minimum number of operators. These designs provide for one level operation. All equipment is so arranged that one operator may have entire charge of each turbine unit including all its auxiliaries. All parts of equipment are easily accessible, thus facilitating inspection and repairs.

All electrical equipment including switchboard and auxiliary motors is located on main floor. This centralizes the control of the plant and insures reliable operation as well as minimum labor.

Well lighted and ventilated buildings insure efficient and reliable operation. Thoroughly fireproof buildings of lowest cost insure lowest possible fixed charges including interest, taxes and insurance. From time to time other features of Unit Power Plant designs dealing with essential parts of power generating systems will be shown here.

Our unit power plant designs permit building for present requirements and allowing for future extensions. A standardization of assembly has been effected based on years of experience which insures maximum value for minimum investment. The cost varies from the initial investment approximately in direct proportion with the installed capacity.

Without obligation or cost on your part, we would be glad to make preliminary recommendations on your problems. Write for Booklet A.

E. W. CLARK & CO., Management Corporation
Columbus, Ohio

The World's best Lubricants

GALENA QUALITY

Going a Step Further

Fifty years of specialization in one particular branch of the oil business — *railway lubrication,* has developed Galena Oils to a state of perfection that they are recognized everywhere as the highest grade railway oils possible to manufacture.

But it is not the policy of this company to rest content with the creation of *better lubrication,* hence the development of *better lubrication service,* as exemplified in the master organization of specialists known as the Galena Mechanical Expert Department.

The co-operation offered through the medium of this exclusively Galena Service is daily proving its value on hundreds of railways, by invariably securing results in efficient and economical lubrication that show quickly in improved operation.

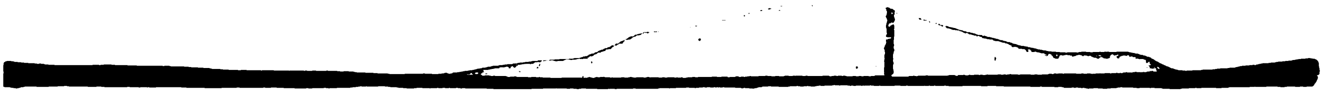
Just as the efforts of duplicating Galena Oils have failed through lack of *quality,* so likewise have the attempts to copy Galena Service been made ridiculous by absence of the vital essentials of knowledge and experience.

When Galena Service Goes In
Lubrication Troubles Go Out!

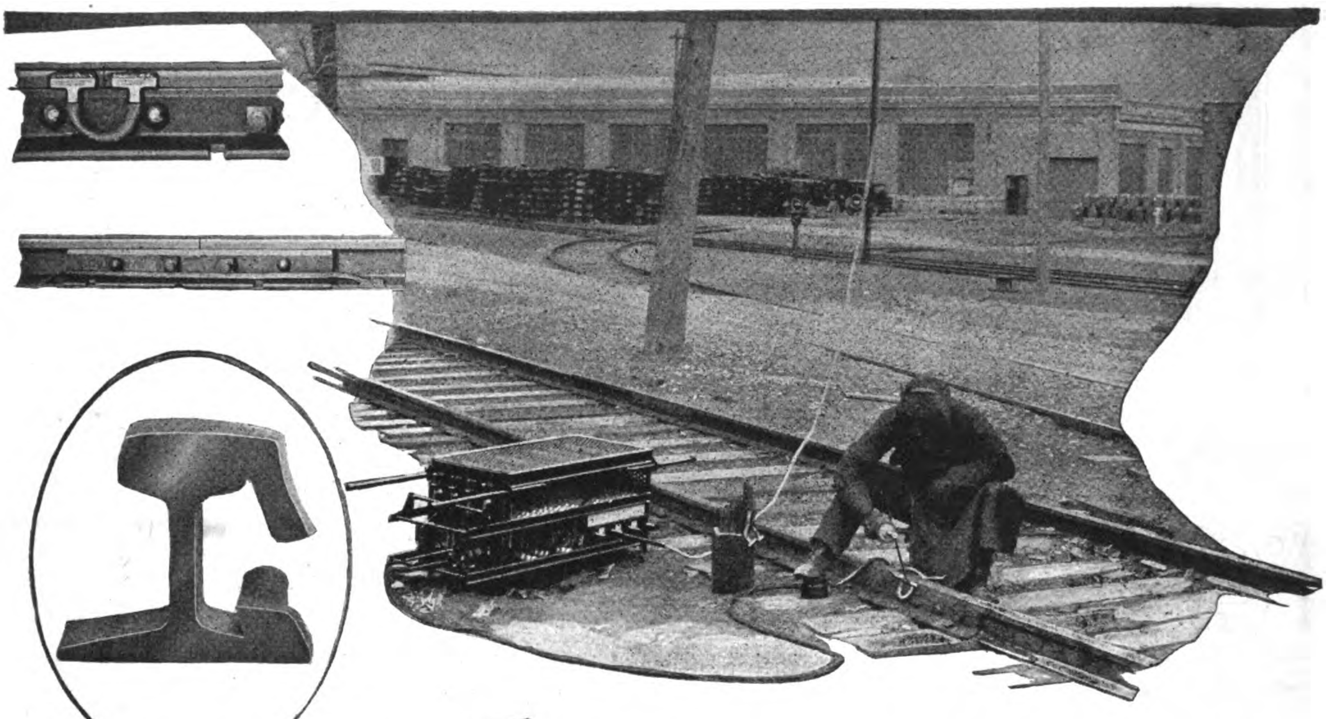
TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE



A rail as long as the system and without a joint would be ideal for the power service of a street railway



SF-1 Arc Weld Bond
For attaching to Rail Head

Making Tracks "Jointless" with G-E Welded Bonds

Welding a bond to a rail today need not be the troublesome task of fusing copper with steel. G-E Rail Bonds have steel faces expertly arc welded in the factory to drop forged copper terminals. Thus a track welder merely makes the perfect steel weld he is used to, and the bond becomes an integral part of the track—wiping out the joint.

G-E Welded Rail Bonds, either U-shaped for rail heads or of the flexible, long type for spanning splice bars are the outgrowth of broadest experience in railway work. They can be supplied in forms to satisfy any need.

SF-4 Arc Weld Bond
For use with Weber Joints

SF-6 Arc Weld Bond
For attaching to rail base

General Electric Company

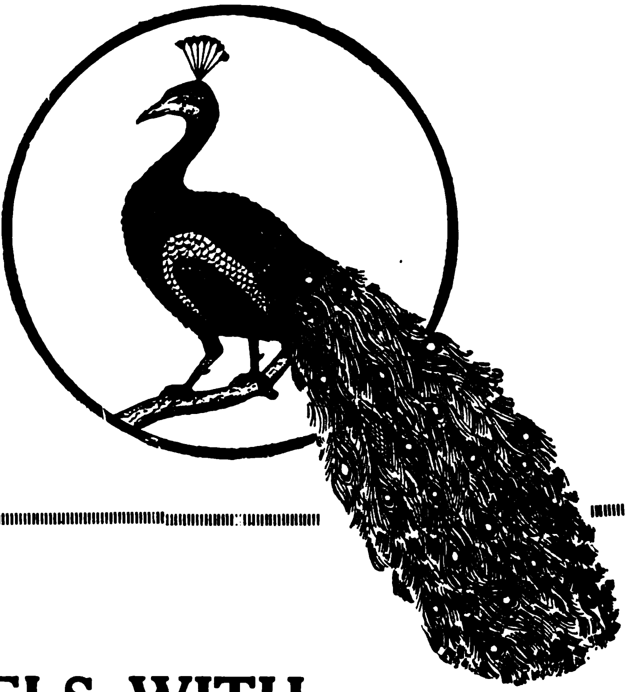
General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-187

PEACOCK SAYS—

don't leave it
to the fender!



An effective fender is
good insurance, but—

STOP THOSE WHEELS WITH

PEACOCK BRAKES

The fender may succeed in snatching a life from the on-rushing wheels, but the motorman and the claim department would rather *stop those wheels.* That's why they praise the quick stops and perfect control obtained with Peacock Brakes.

Always Ready

No question about being able to use a Peacock Brake in time of emergency. This is a brake which the motorman understands and trusts like an old friend in time of need.

The Peacock Staffless

Always Recognized

No question about recognizing Peacock Brakes. Their unique appearance is familiar to every experienced motorman who has been railroading around the country. Watch for them when you are inspecting other properties.

NATIONAL BRAKE COMPANY
890 Ellicott Square
Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis
115 BROADWAY, NEW YORK
Detailed Examinations by Experts
REPORTS FOR FINANCING COVERING
Valuation Turnover
Costs Reserves Rates
UTILITIES INDUSTRIALS SHIPPING

THE J. G. WHITE ENGINEERING CORPORATION
Engineers—Constructors
Industrial Plants, Buildings, Steam Power Plants, Water Powers. Gas Plants, Steam and Electric Railroads, Transmission Systems
43 Exchange Place, New York

STONE & WEBSTER
Incorporated
Design and Construct
STEAM POWER STATIONS
WATER POWER DEVELOPMENTS
TRANSMISSION LINES AND SUBSTATIONS
INDUSTRIAL PLANTS GAS PLANTS
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
OPERATING, TRAFFIC AND RATE INVESTIGATIONS
SCHEDULES—CONSTRUCTION—VALUATIONS
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52 VANDERBILT AVE., NEW YORK

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ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

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Consulting Engineer
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Reorganization, Operation, Management
683 Atlantic Ave., Boston, Mass.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

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Rate, Traffic and Reorganization Investigations
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ALBERT S. RICHEY
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WALTER JACKSON
Consultant
FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
143 Crary Ave., Mt. Vernon, N. Y.
Address June and July:
13 Ranulf Road, Hampstead, N. W. 2, London, Eng.

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Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports
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743 Hanna Bldg. 84 Pine St.

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Consulting Engineers
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Chicago Kansas City
Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

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Consultant and Specialist
Energy Measurement
For Electric Railways
Investigations · Tests · Recommendations
Old Colony Bldg. Chicago

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells John F. Layng Albert W. Hemphill
APPRAISALS
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Reorganization Management Operation Construction
43 Cedar Street, New York City

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ELECTRIC RAILWAY JOURNAL
Every Week

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HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

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Philadelphia, Pa. . . . . Widener Building
Boston, Mass. . . . John Hancock Building
Baltimore, Md. . . Continental Trust Building
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Cincinnati, Ohio . . . Union Trust Building
Atlanta, Ga. . . . . . Candler Building
Cleveland, Ohio . . . . Guardian Building
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CHICAGO, ILL. . 208 South La Salle Street

St. Louis, Mo. . Third National Bank Building
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MARK WOLFF
Certified Public Accountant
Specializing in Public Utility Rate Cases
Statistical Analyses Financial Investigation
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FLATIRON BUILDING NEW YORK CITY

The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
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NEW YORK PHILADELPHIA CHICAGO

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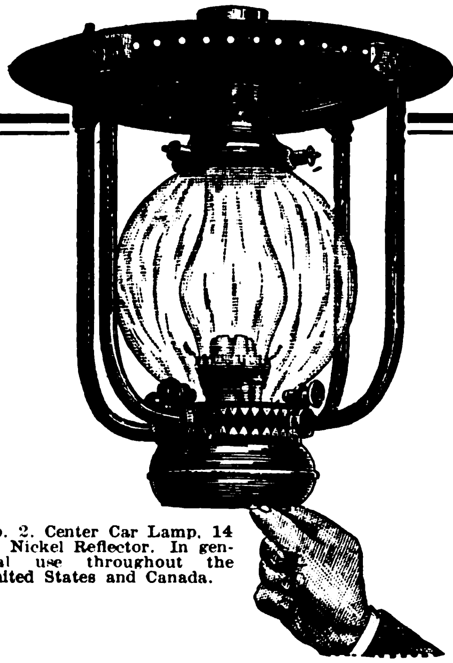
THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
DETECTIVES
Street Railway Inspection
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



No. 2. Center Car Lamp, 14 in. Nickel Reflector. In general use throughout the United States and Canada.

Thirty-two years ago—One of the exhibits in the 1889 Convention Issue

THE BIG EVENT

of the

ELECTRIC RAILWAY YEAR

The Convention of the

American Electric Railway Association

this year at Atlantic City during the week of October 3

A FEATURE OF THE BIG EVENT

The exhibit of electric railway equipment, materials and supplies.

This year bigger and better than ever before in the advertising section of the

ELECTRIC RAILWAY JOURNAL

In which the leading manufacturers have exhibited their newest and best products for more than a generation. The date of this year's exhibit or

CONVENTION ISSUE, SEPTEMBER 24, 1921

ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, NEW YORK

PENETRATION

The Yard Stick That Measures Pole-Life

IN the Butt-Treatment of poles every pole buyer knows that only by guaranteed uniform penetration can he be sure that his poles are insulated against decay.

In the P & H Guaranteed Penetration Process, for the first time in the pole industry uniform depth of penetration of the preservative throughout the groundline area is guaranteed.

The specifications for the P & H process are not merely a specified method. Specifications for the P & H Guaranteed Penetration Process call for a definite result that must be obtained—½ inch uniform penetration. This result is guaranteed to pole buyers.

This is the practical solution of your greatest pole problems and assures longer life for poles, fewer replacements and lower maintenance costs.

On the end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is countersunk the metal disc shown below. With every shipment of poles the buyer receives the written guarantee. These are your assurance of guaranteed uniform penetration.

Sample selected at random, showing the uniform one-half inch penetration.

Accept no substitute process of Butt-Treatment.
Insist on the P & H Guaranteed Penetration Process.

Full Particulars on Request

PAGE & HILL CO.
Minneapolis, Minn.

BRANCH OFFICES:

Times Bldg., NEW YORK, N. Y.
717 Bryant Bldg., KANSAS CITY, MO.
19 So. La Salle, CHICAGO, ILL.
1111 Carter Bldg., HOUSTON, TEXAS
311 Sumpter Bldg., DALLAS, TEXAS
1416 Starks Bldg., LOUISVILLE, KY.

Originators of the P & H Guaranteed Penetration Process. Producers, manufacturers, and foremost in the Butt-Treatment of Poles.

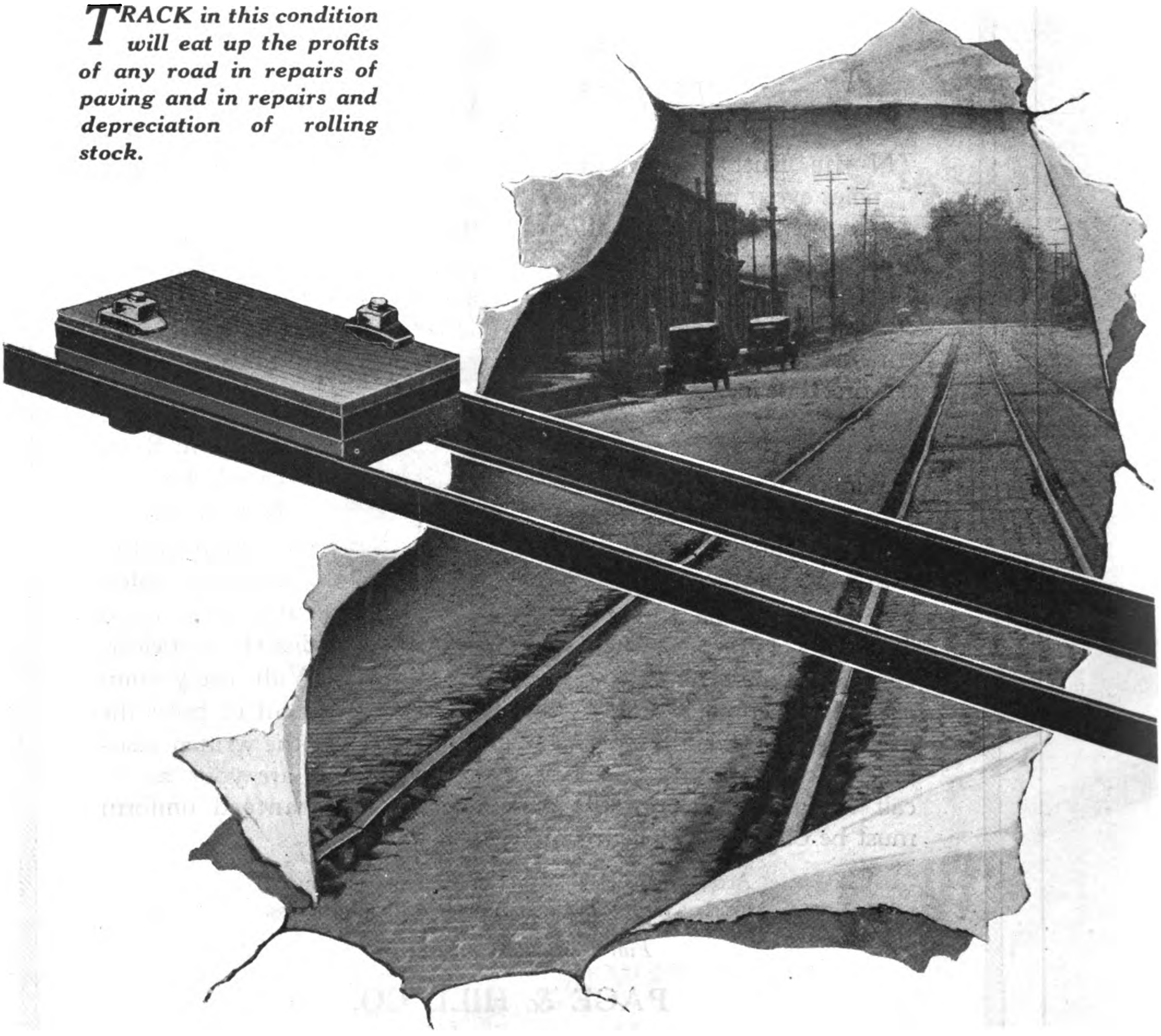
Butt-Treated
BY
PAGE & HILL C°
1921
GUARANTEED
One-Half Inch
PENETRATION

This disc countersunk on the butt-end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is your assurance of one-half inch penetration.

Butt-Treated
BY
PAGE & HILL C°
1921
GUARANTEED
One-Half Inch
PENETRATION

NOW You can relay

TRACK in this condition will eat up the profits of any road in repairs of paving and in repairs and depreciation of rolling stock.



DAYTON

that stretch of bad track

with a construction

—that foremost engineers recognize as the most dependable
—that the test of time has proven will outlast all others
—that will save you from $2,000 to $6,000 per mile

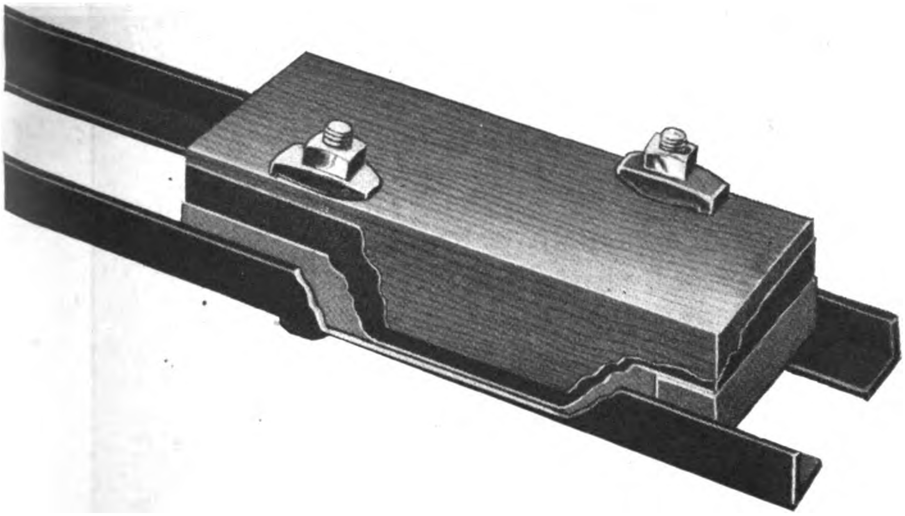
Endorsed by Engineers Engineers everywhere endorse, without question, Dayton Resilient Ties. They now acknowledge that track construction without resiliency will fail, regardless of how heavy the rails or how thick the foundation.

Many roads have adopted Dayton Resilient Ties as their standard for all track construction, because the wood block and bed of asphalt of these ties protect the track foundation from disintegration by absorbing all vibrations and hammer-like blows caused by rolling stock.

Proven by Time Time has proven beyond dispute that Dayton Resilient Ties are built on the only correct principle for track construction. In more than twelve years there is not a single case on record of any track or joint failure where Dayton Resilient Ties have been used. Not only that, but the first track laid on these ties is still apparently as good as the day it was put down. Not one penny has been spent either for up-keep of track or paving repairs, and from all indications it will serve for twelve more years.

Reduce First Cost The first cost of track laid on Dayton Resilient Ties is less per mile than for any other construction. Through their use you will save more than $2,000 per mile over track laid on wood ties in gravel ballast, and more than $6,000 per mile over track laid on wood ties in concrete.

Repairs to rolling stock are practically eliminated, because the vibrations are absorbed by the wood block and asphalt in each tie, preventing the crystallization of steel and the chattering and loosening of all car parts.



Mail Coupon for Complete Facts

Let us tell you in detail all about Dayton Resilient Ties. Let us tell you the experiences of other users. Just have your stenographer pin the attached coupon to your letterhead and we will send you our bulletin which shows in detail the construction of Dayton Resilient Ties, how they are installed, and photographs of successful installations.

The Dayton Mechanical Tie Co.
708 Commercial Bldg., Dayton Ohio

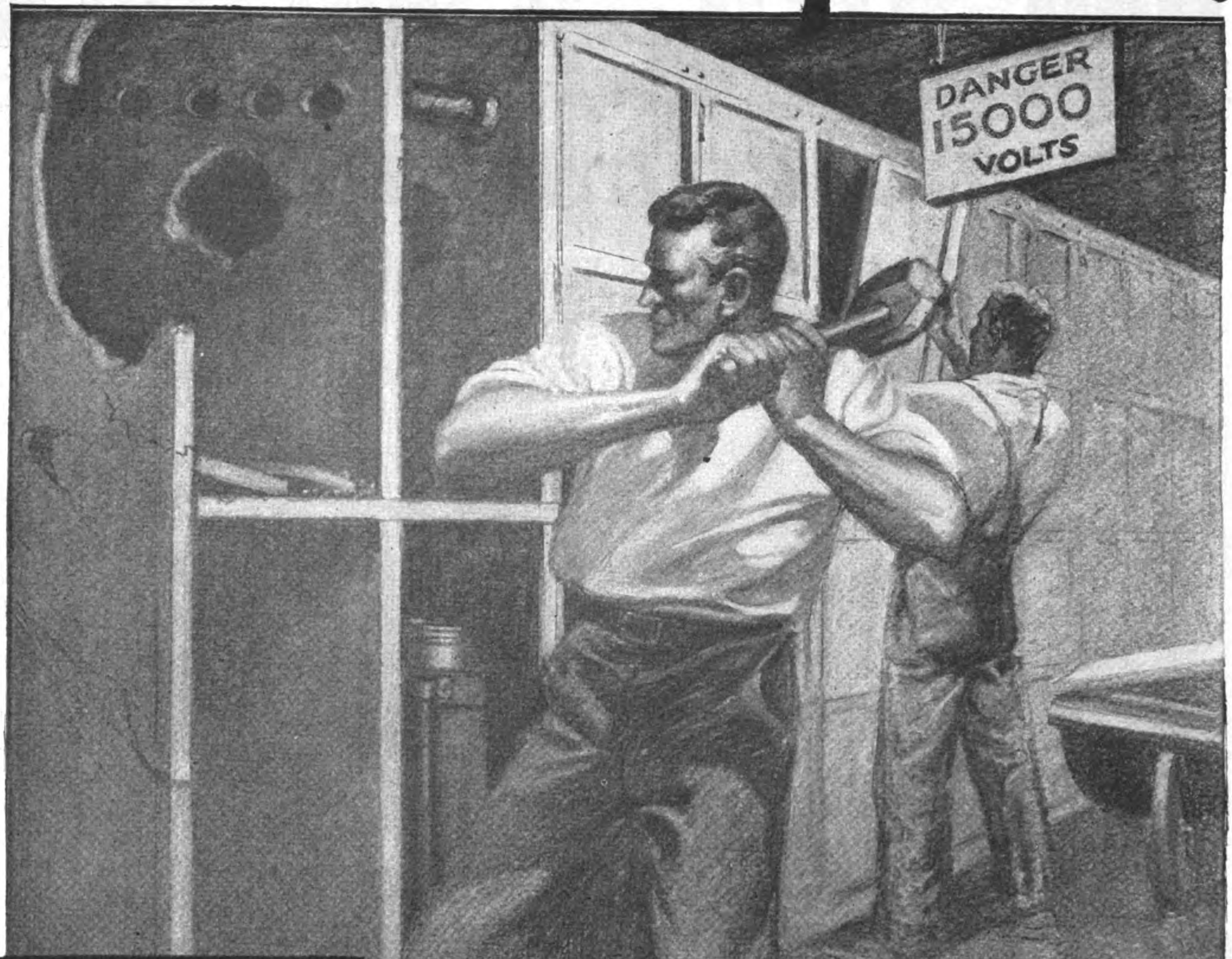
Resilient TIE

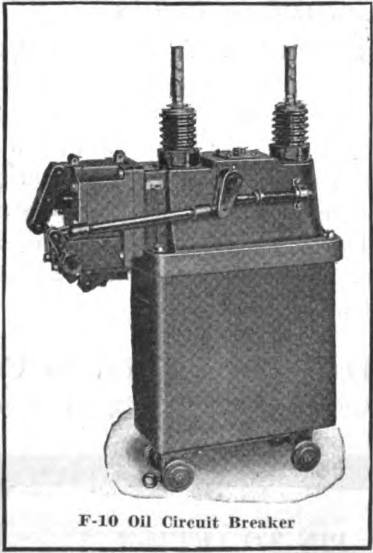
PIN TO LETTER

Dayton Mechanical Tie Company
708 Commercial Bldg.,
Dayton, Ohio

Without obligation, please send me full information about your Dayton Resilient Ties.

Save this expense!





F-10 Oil Circuit Breaker

Don't tear down cell structures—yet increase interrupting capacity three to eight times. You can do it by installing CONDIT F-10 *Removable Unit* Oil Circuit Breakers. Have our specialist analyze your problem.

CONDIT ELECTRICAL MFG. CO.
Manufacturers of Electrical Protective Devices
Boston 27, Mass.

Specifications: Manually or electrically operated; 500, 800 and 1,200 amperes—25,000 volts; interrupting capacity 10,000 amperes—15,000 volts; 1, 2, 3 or 4 pole.

CONDIT

N-L
MECHANICAL
· SANDERS ·

1356 Mechanical Sanders sold the first five months of 1921

When a mechanical device is accepted and installed as standard equipment by the most progressive Electric Railways in the United States it's a true indication that that device is filling a *real want* and performing an important and necessary *service.*

That's the present situation as regards N-L Mechanical Sanders.

Ten large Electric Railways have bought N-L Mechanical Sanders so far in 1921—made them standard equipment on a total of 1356 street cars.

These electric railways regard the purchase of this equipment not as an expense but as an *investment*—an investment that now pays and which will continue to pay real dividends in the form of 100% *protection* from possible accident due to lost air.

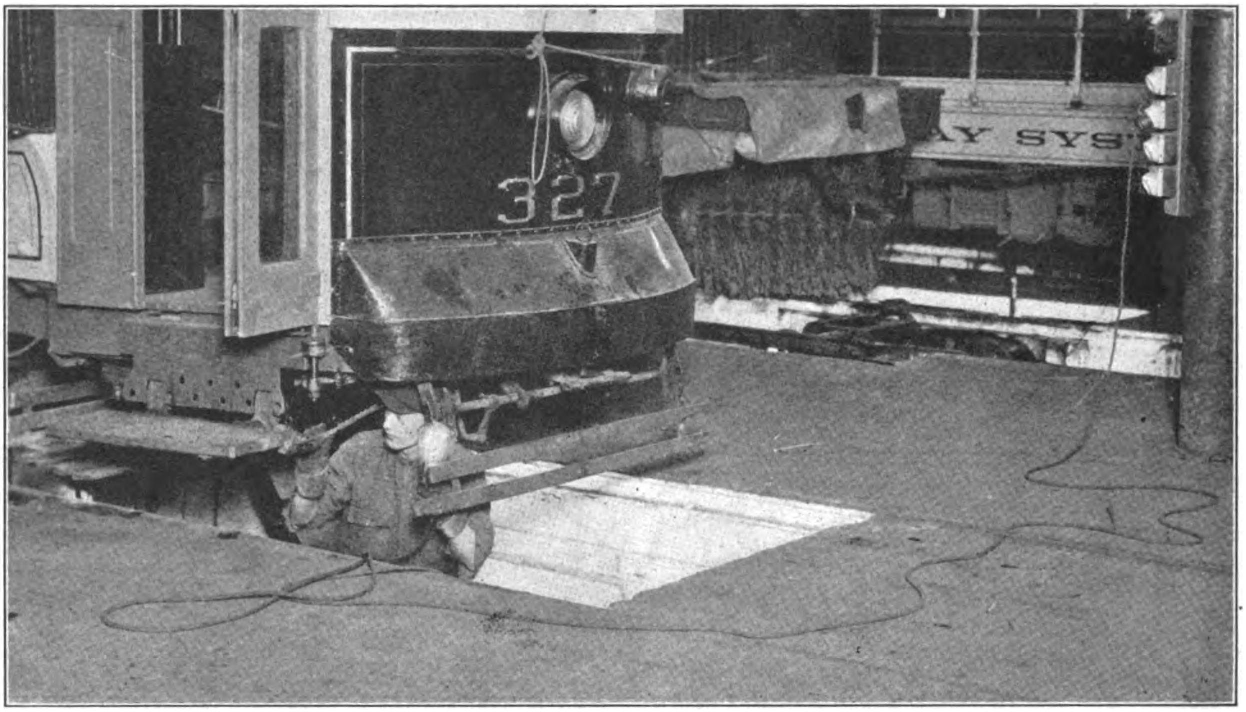
As an emergency device the N-L Mechanical Sander used with a hand brake is a real life saver. It is the only combination that can prevent cars from running away when air is lost. As an economical device in regular service N-L Mechanical Sanders prevent the motorman from misapplying his control apparatus, starting the emergency flow of sand and flooding the track with it. N-L Mechanical Sanders apply all the sand you *need* but *no more.* Your cars don't come back empty every night.

The service other Electric Railways have secured thru the use of N-L Mechanical Sanders can be duplicated on your property.

Write today for complete data—without cost or obligation.

The **NICHOLS-LINTERN CO.**
8404 Lorain Avenue, Cleveland, Ohio

N-L INDICATING SIGNALS
MECHANICAL SANDERS



DURADUCT and DURACORD

These two types of electric cable have the quality that their names attempt to imply—DURABILITY. They are built to endure the extremely hard usage of electric railway service, both in car wiring and in shop work.

For Car Wiring—85% Lighter than Metallic Conduit

Iron conduit is no longer a necessity—it is just another overweight luxury to drag around.

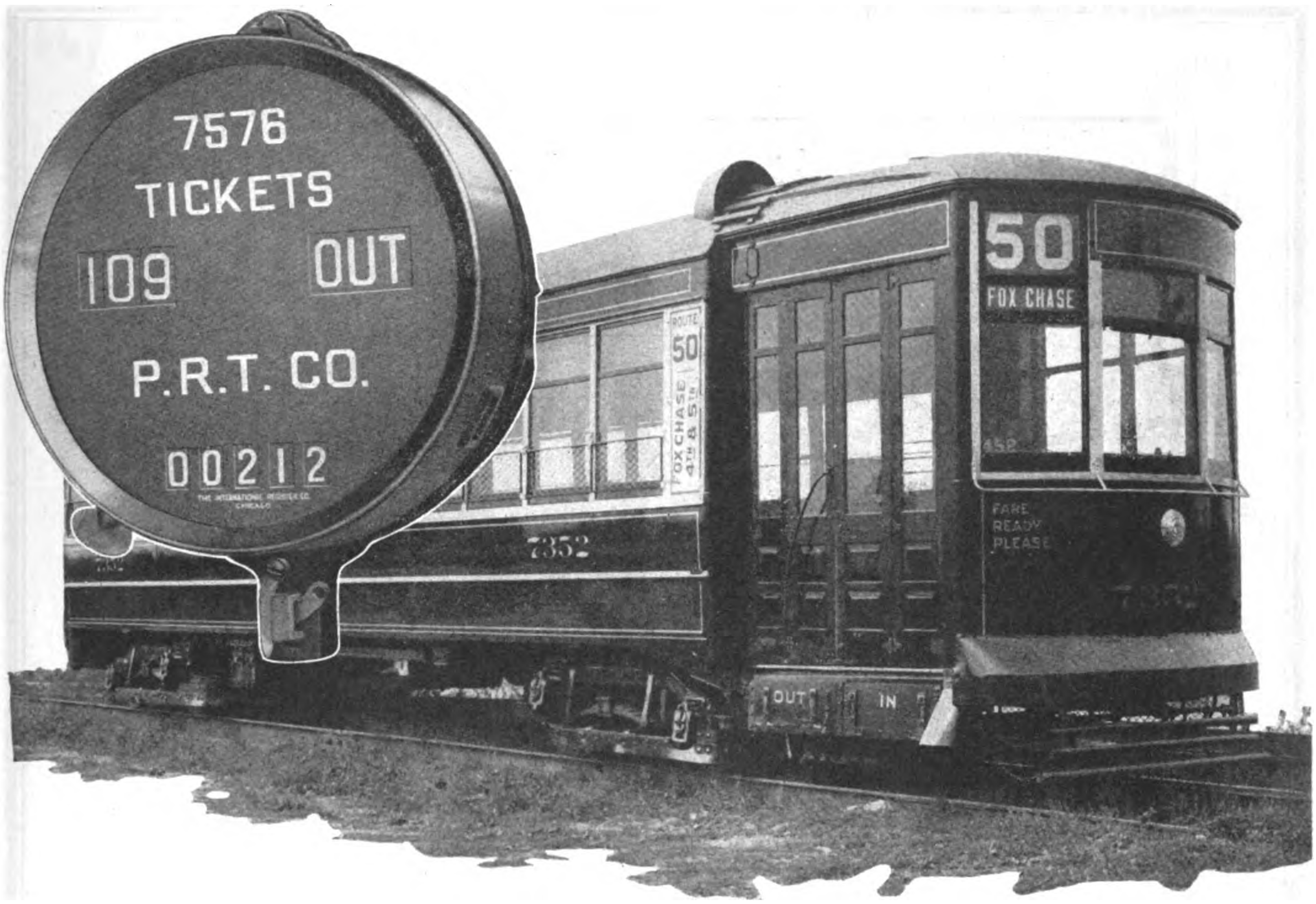
Notice the increasing number of new car orders specifying DURADUCT wiring. The following representative case illustrates why. One of the best-known large city cars built several years ago had all metal conduit wiring weighing 569 lb. If built today, with DURADUCT substituted in exactly the same layout, the weight would be 62.6 lb., a saving of 506.4 lb., or 89%. Other examples range from 85% to 90% saving in weight.

Is not such a saving worth while on your safety car equipment, when light weight is a controlling factor? Specify durable, waterproof and flame-resisting DURADUCT.

For Portable Lamps and Tools—Extreme Flexibility

Dragged across the car-house floor, kinked, trampled underfoot and yanked around generally, DURACORD is built to stand the worst abuse that can be heaped upon a portable cord. It lasts!

TUBULAR WOVEN FABRIC CO., Pawtucket, R. I.



2654 International Registers for the Philadelphia Rapid Transit Co.

Back in 1901 and 1902 the Philadelphia System bought their first International Registers, 350 of the standard type R-7. In 1908 and 1909 the system was completely equipped with the same type of register by a repeat order for 2200 registers. Since then additional orders have brought the total to over 2900 International R-7 registers.

Installation of a ticket fare on this property made necessary the installation of an additional register. The superior service given through many years by the International Type R-7 Register on this road was such that an immediate decision was made to use this register, resulting in the order for 2654 which brings the total of these registers in use on this system to over 5500.

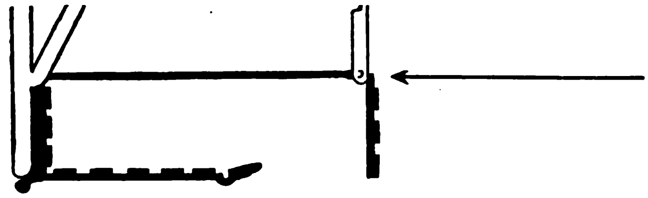
With the new fare collection system, one register will be used for cash fares. The first registers, built in 1901 and 02, are many of them still in service and have proved entirely satisfactory. Duplication of the entire present equipment by the addition of over 2600 International Registers of the same type is the best possible testimonial of the satisfactory service rendered by International equipment.

Besides the type R-7 used in Philadelphia, we manufacture single and double registers, counters, and car register fittings for all requirements of street railway and city systems.

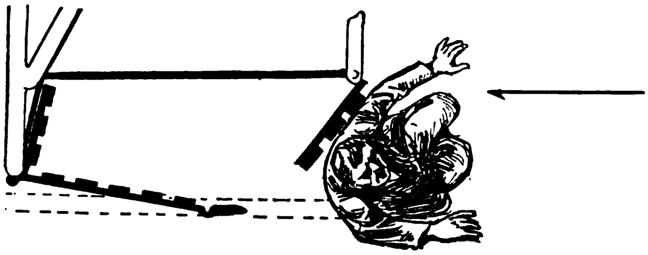
Exclusive selling agents for
HERREN ENAMEL BADGES

The International Register Co.,

15 South Throop Street,
Chicago



This mechanically sensitive "feeler"



Acts instantly and automatically

That's why practically all users of safety cars, now consider that they are not truly safety cars until equipped with

H-B LIFE GUARDS

Along with the automatic devices to protect the passengers on the car, you need an automatic fender, which functions independently of the car operator at any and all times, to protect the people who are outside the car.

Making
the Safety Car
Safer
by Installing
H-B Life Guards

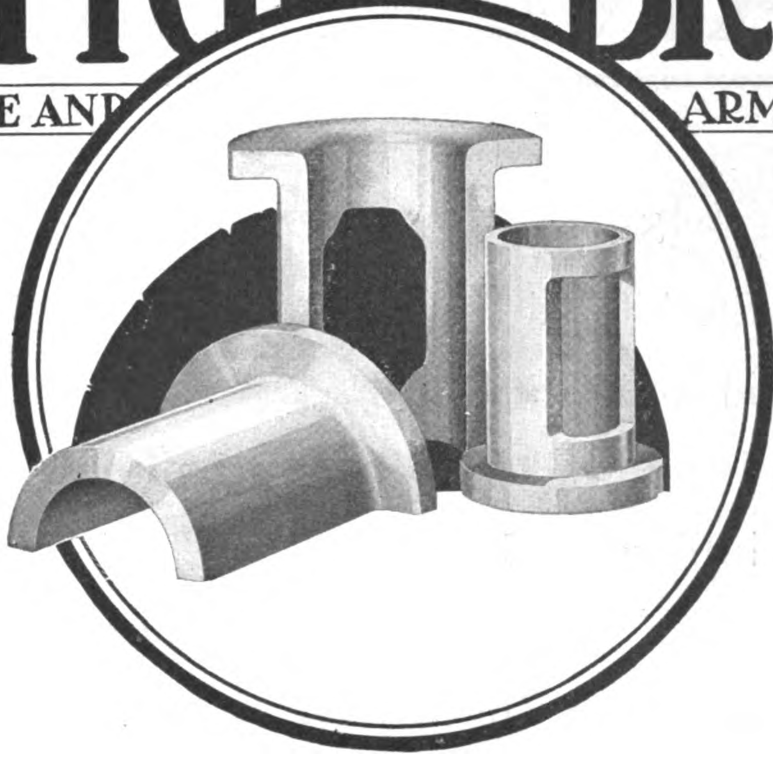
The Consolidated Car Fender Co., Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co., 61 Broadway, N. Y.

"TIGER" BRONZE

AXLE AND ARMATURE BEARINGS



It will pay you to investigate the money saving possibilities of Tiger Bronze Bearings and to learn more about the engineering service that goes with them. Write today for details.

Better Service means lower ultimate cost

Buyers of electric railway equipment have learned that low first cost usually means high ultimate cost—and *ultimate* cost is the only true measure of economy.

Take armature bearings for example. The use of low cost, low quality bearings is bound to result in the constant laying up of cars for bearing renewals and for the rewinding of armature coils. High quality bearings eliminate all this expense and save the revenue that's lost while the cars are out of service.

More-Jones "Tiger" Bronze Axle and Armature Bearings are *high quality* bearings. Every day they are helping to reduce maintenance costs on some of the most progressive electric railroads in the country.

MORE-JONES BRASS & METAL CO.
St. Louis, Mo.

TROLLEY WHEELS:
V-K *Oilless*. M.J. *Lubricated*
HARPS: V-K *Non-Arcing*
BEARINGS: *"Tiger" Bronze Axle and Armature*
ARMATURE BABBITT
and Similar Products

MORE-JONES

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings Iron Forgings
Forged and Rolled Steel
Pipe Flanges
Ring Dies
Rings
Roll Shells Steel Springs

"The 'Standard' Brand on your material is an assurance of eventual economy."

STANDARD STEEL WORKS CO.

GENERAL OFFICES

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units. The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.

Bates Expanded Steel Truss Co.

908 South La Salle Street
CHICAGO, ILLINOIS

CHEATHAM

Here is what a Railway in the State of Washington has to say about the "CHEATHAM SWITCH" when used in connection with

SAFETY OR ONE-MAN CARS

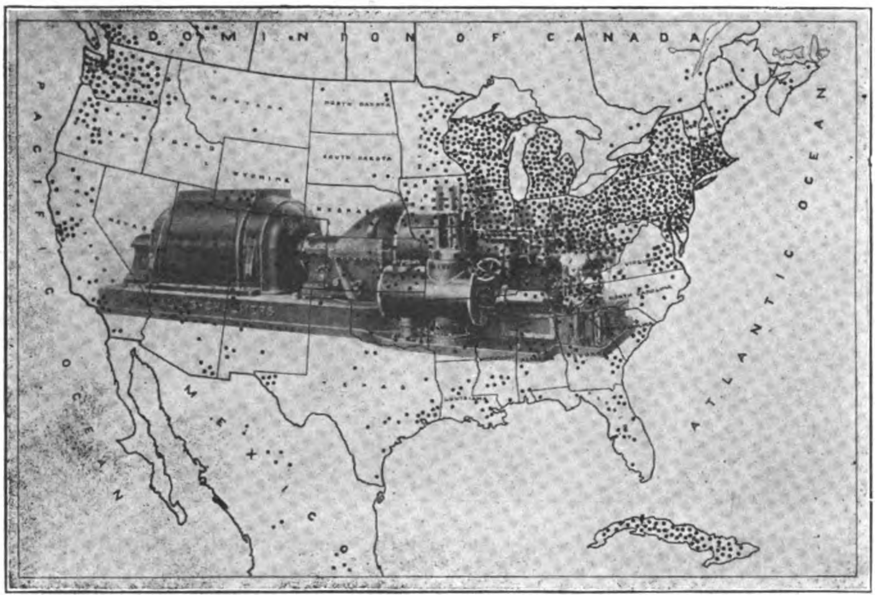
"Relying to your letter, wish to state that we are very much pleased with the CHEATHAM ELECTRIC SWITCHES recently installed. The switches have worked to our satisfaction and have contributed materially in the matter of keeping up schedules, particularly with the one-man cars."

SWITCH

Write

Cheatham Electric Switching Device Co.
4780 Ashbottom Rd., Louisville, Ky.

Allis-Chalmers Steam Turbine and Alternator Units



Each Dot represents an Allis-Chalmers Steam Turbine installation and a satisfied customer.

Satisfied customers are possible only through efficient and uninterrupted service.

Allis-Chalmers Steam Turbines are highly efficient, rugged in construction, built for continuous service.

ALLIS-CHALMERS
MILWAUKEE, WIS. U.S.A.

Keep this line A-MOVING

Passengers held up in the line while someone ahead waits for change will appreciate the more rapid loading when you install a ticket fare system. And you can appreciate yourself what the speeding up of operation will mean to your Company.

GLOBE TICKETS

Designing tickets and transfers has been our business for nearly forty years. Our experience in solving all kinds of ticket problems is at your service. Tickets in convenient strips, rolls or books designed to meet your special conditions whatever they may be. Our P.M. coupon transfer is a positive preventative of those all-day stop-overs. It is also a time-saver. Where every motion counts, elimination of even one punching on every transfer adds up to valuable minutes in the day's work.

GLOBE TICKET COMPANY
112-114 N. 12th St., Philadelphia, Pa.

"Tool Steel" gears
In severest test,
For thirteen years
Have proven best.

Don't Be Satisfied

The world owes its advance to healthy dissatisfaction. Man, not contented with conditions, has striven constantly and still strives to improve these conditions, which has resulted in the wonderful devices, machinery and equipment we have today and will result in the more wonderful devices still to come.

Carnegie Steel Company has constantly endeavored to improve, wherever possible, its methods of manufacture. As a result

Carnegie Steel Gear Blanks

today are manufactured under conditions that make possible the highest quality of product. Every step in their manufacture, from quarry to finished product, is under the careful supervision of experts.

Don't be satisfied with less than the best. Gears cut from Carnegie Blanks will outwear ordinary cast steel gears three or four times. On your next order of gears from your gear cutter, it will pay you to

Specify Carnegie Blanks

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

1426

564-BP-417
EVERY
NUTTALL
GEAR
IS
REGISTERED

Heat Treated Gears

The Nuttall Guarantee

We guarantee the material we furnish to be of high grade, free from defects liable to affect the strength of finished work; also, that all machining will be accurate and the finished product in accordance with the specifications.

We will replace any gears developing serious defects in material or not correctly machined.

It is impossible to guarantee gears in terms of specific life, because we have no control over the conditions upon which the life of a gear depends after installation, such as lubrication, protection from grit, correct alignment and centering of shafts.

We do, however, guarantee the life of Nuttall Heat Treated Steel Gearing to exceed the life of untreated, medium carbon cast steel gearing in identical service, as shown by the following ratios

Basis of Comparison:

CS—Standard Cast Steel	100
BP—Special Process	400
NP—Special Process Cast Steel	300

We will replace any gears not fulfilling this guarantee, subject to an adjustment based upon the percentage of actual to guaranteed life.

**All Westinghouse Electric & Mfg. Co.
District Offices are Sales Representatives
in the United States for Nuttall Electric Railway
and Mine Haulage Products**

**R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA**

Nuttall

Buy Now - Save Now
Safety Car Prices are Lower

Buy now and save from the start—Speed up schedules and increase earnings—Make your net help pay first cost—Others do it—You can—We'll convince you—Inquire!

**St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"**

AMELECTRIC PRODUCTS
BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE
Reg. U. S. Pat. Office
Galvanized Iron and Steel Wire and Strand
Incandescent Lamp Cord
AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

U. S. Electric Contact Signals
for
Single-track block-signal protection
Double-track spacing and clearance signals
Protection at intersections with wyes
Proceed signals in street reconstruction work
United States Electric Signal Co.
West Newton, Mass.

COPPER CLAD STEEL COMPANY
OFFICE AND WORKS: RANKIN, PA. BRADDOCK P. O.
WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.
NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK CITY
COPPERWELD Wire—*made by the Molten Welding Process*
Bare—Weatherproof—Strand.

AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
Albert & J. M. Anderson Mfg. Co.
289-93 A Street, Boston, Mass.
Established 1877
Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 48 Milton Street

ANACONDA
Copper Wire
111 W. Washington St., Chicago

ROEBLING
Electrical Wires and Cables
JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Protect Your Highway Crossings

with Nachod Highway Crossing Signals. They prevent damage suits, and let you sleep easier at night. Furnished with bell, wig wag and flashing lights, independently operated. Also singly, or in any combination.

NACHOD SIGNALS

for highway crossings are described in Catalog 720. They are operated from trolley power by high speed overhead trolley contactors without moving parts. Our Catalog 719 tells about Nachod Block Signals; and the Manual about the Automatic Headway Recorder for timing cars.

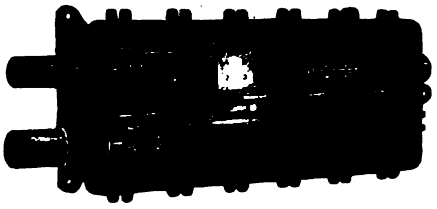
NACHOD SIGNAL CO., INC.
LOUISVILLE, KENTUCKY

Chapman
Automatic Signals
Charles N. Wood Co., Boston

"NATIONAL" BULLETIN
Ask for "NATIONAL" Bulletin No. 14—
"NATIONAL"
TUBULAR STEEL POLES
—free, on request, to electric traction engineers
NATIONAL TUBE COMPANY PITTSBURGH, PA.

BENNETT-FIELD CROSS TIE CO.
FISHER BLDG., CHICAGO
"The Shippin' Fools"
RAILROAD TIES, SWITCH TIES and CROSSING PLANK

LUMBER
Specialists in Street Railway Requirements
Write for List
TIES—TIMBERS—POLES—PILING
DUNCAN LUMBER COMPANY, Portland, Oregon



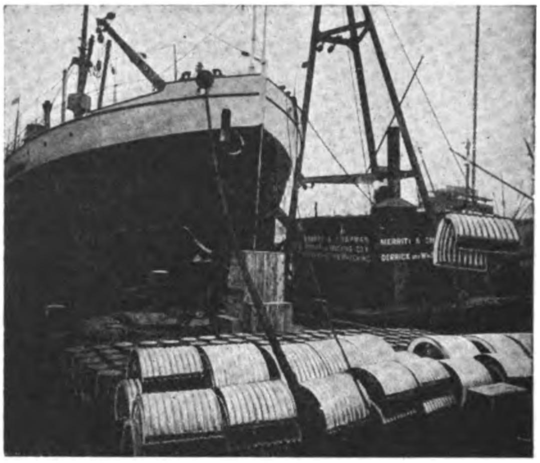
Manhole Junction Box for Underground Feeder Circuit.

THE installation, operation and maintenance of underground cable systems is greatly simplified by the use of STANDARD junction boxes. The illustration shows a specially designed box for trolley feeder service which makes possible the disconnecting and sectionalizing of the different parts of the circuit while alive by simply opening one or more quick-break knife switches. This box is easily and quickly connected with the cable by wiped joints. It is perfectly waterproof when installed.

STANDARD Underground Cable Co.
Pittsburgh, Pa.

Boston	Washington	Chicago	San Francisco
New York	Atlanta	Salt Lake City	Seattle
Philadelphia	Detroit	Minneapolis	Los Angeles
	Kansas City	St. Louis	

For Canada: Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont.



"ACME" (NESTABLE) TONCAN CORRUGATED METAL CULVERTS

At the N. Y. docks foreign bound steamers often take shipments of "ACMES" and leave other freight behind. They do this because "ACMES" are not bulky. Made in 2 ft. upper and lower sections they are shipped nested. Here in the U. S. this point is of great value as it means lower shipping costs and often quicker deliveries. Write for catalog M-21.

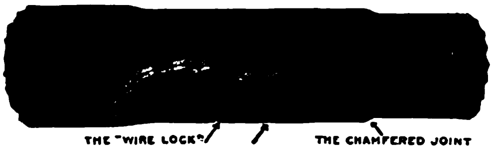
THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U. S. A.

High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

SPECIAL TRACKWORK
Of the well-known WHARTON Superior Designs and Constructions

STEEL CASTINGS	FORGINGS	GAS CYLINDERS
CONVERTER AND ELECTRIC	DROP, HAMMER AND PRESS	SEAMLESS STEEL

WM. WHARTON JR. & CO., Inc., Easton, Pa.
(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)
ORIGINATORS OF
MANGANESE STEEL IN TRACKWORK

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Peirce Forged Steel Pins with Drawn Separable Thimbles
Your best insurance against insulator breakage
Hubbard & Company
PITTSBURGH, PA.

THE BABCOCK & WILCOX COMPANY STEAM

IN 1898

STEAM SUPERHEATERS

Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

BOSTON, 49 Federal Street
PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers Deposit Bank Bldg.
CLEVELAND, Guardian Bldg.
CHICAGO, Marquette Building
CINCINNATI, Traction Bldg.
ATLANTA, Candler Bldg.
TUCSON, ARIZ., 21 So. Stone Avenue
NEW ORLEANS, 533 Baronne Street
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Bldg.
HONOLULU, H. I., Castle & Cooke Bldg.
SAN FRANCISCO, Sheldon Bldg.
LOS ANGELES, 404-406 Central Bldg.
SEATTLE, L. C. Smith Bldg.
HAVANA, CUBA, Calle de Aguiar 104
HOUSTON, TEXAS, Southern Pacific Bldg
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ERICO
ECONOMICAL
EFFICIENT
RAIL BONDS

THE ELECTRIC RAILWAY IMPROVEMENT CO.
CLEVELAND, OHIO

BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

NILES-BEMENT-POND CO.
111 BROADWAY, NEW YORK

MACHINE TOOLS
FOR ELECTRIC RAILWAYS

Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools

WE-FU-GO AND SCAIFE
WATER
PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

THE CUTTER ELECTRICAL AND MANUFACTURING CO. CIRCUIT I-T-E BREAKERS PHILADELPHIA

I. T. E.
Circuit Breakers
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

SPECIFY
THE TERRY TURBINE
For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
Hartford, Conn.

BAKELITE-DILECTO

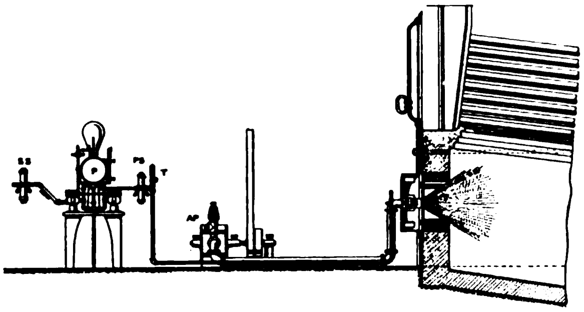
The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

The Continental Fibre Co., Newark, Delaware
Branch Offices:
CHICAGO, 332 S. Michigan Ave. NEW YORK, 233 Broadway
Pittsburgh Office, 301 Fifth Ave. San Francisco Office, 525 Market St.
Los Angeles Office, 411 S. Main St.
Canadian Office, 1710 Royal Bank Bldg.,
Cor. King and Yonge Sts.
Toronto, Ont.,

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. 111 Broadway, New York



KOERTING
FUEL OIL BURNING SYSTEM

Over 1,000,000 h.p. equipped with this system, which is superior to the air or steam atomizing system in regard to economy.

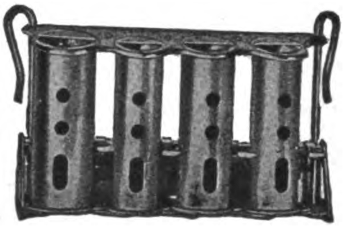
Ask for Catalog 6-O.

SCHUTTE & KOERTING CO.
1155 Thompson Street
Philadelphia, Pa.

HIGH SPEED MONEY CHANGERS

The new 1921 model —without rivets— ready for delivery

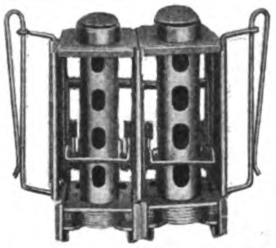
Supplied in one or four tube combinations



Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them. Prices and literature sent on request.

J. L. GALEF, 75 Chambers St., New York City
Exclusive Manufacturers' Selling Agent

JOHNSON Universal Changer



Adjustable

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.

A Wrench That IS a Wrench

The strongest and most durable heavy-duty screw wrench made—The W & B "Railroad Special." Head and bar drop-forged in one piece; jaw extra heavy and thoroughly casehardened. Fitted with indestructible iron handle and easy-acting solid steel screw.

Seven sizes, from 6 to 21 in.; maximum capacity of opening, 3 15/16 in. Guaranteed.

Screw Wrench Book on Request.

J. H. WILLIAMS & CO.
"The Wrench People"

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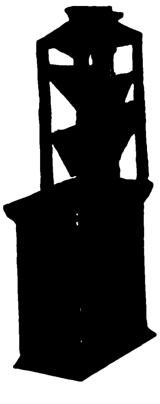


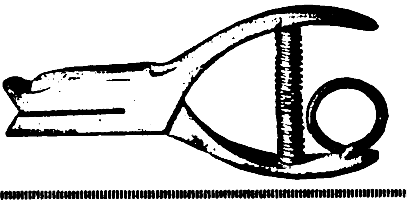
CLEVELAND FARE BOXES

reduce fare collection to its simplest form—the practical fare box for *One Man Car* operation.

The Cleveland Fare Box Company
CLEVELAND, OHIO

Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

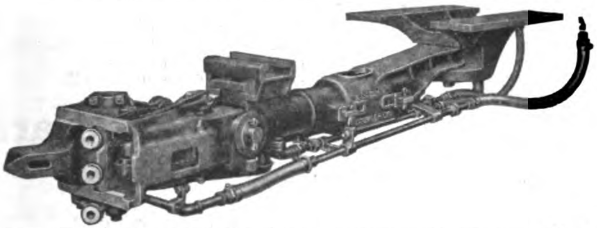
Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
30 Church Street, New York City



Economical in the Long Run

BONNEY-VEHSLAGE TOOL CO.
Newark, N. J.

Van Dorn
Car-Air-Electric Couplers
for
Rapid Transit Service



Van Dorn No. 1450 Tight-Lock Car-and-Air Coupler

Van Dorn Car-Air-Electric Couplers represent the last word in coupling equipment for modern rapid transit service.

A delay in making up trains, under little headway, to care for the peak load, results in heavy losses. Van Dorn equipment which effects, simultaneously, a safe, unyielding coupling of cars, air lines and electric circuits, minimizes these losses.

The positive tight-locking and "take-up" devices of the coupler head, the unlocking eccentric and the "tell-tale" safety devices are among the many distinctive and up-to-the-minute features of Van Dorn Couplers.

Let us tell you more about the utility, economy, and reliability of Van Dorn Car-Air-Electric Couplers for your motor-trailer or multiple-car rapid-transit lines.

Van Dorn Coupler Company
2325 So. Paulina St., Chicago, Ill.

STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

THE DIFFERENTIAL STEEL CAR CO.

H. Fort Flowers, Pres. & Gen. Mgr.
FINDLAY, OHIO

FORT PITT SPRING AND MANUFACTURING CO.
PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

"Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

"LE CARBONE"
CARBON BRUSHES

They are uniform in quality

They talk for themselves

W. J. Jeandron
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

HORNE MANUFACTURING CO.
Mercer and Colgate Streets, Jersey City, N. J.

Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

POSITIONS VACANT

CHIEF draftsman for street car building plant. Must be experienced in street car work and capable of taking charge of small drafting room. Designing ability and experience especially desired. State age, record, salary expected. P-913, Elec. Ry. Journal.

MAN wanted who can repair armatures, cars and do general shop work. A good position for the right man. P-916, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITIONS WANTED

CAPABLE technical man of proven executive ability, now employed, seeks opportunity in responsible position where initiative and dependability count and are valued; 19 years' experience in electric railway field; 16 years as executive in charge; thoroughly competent in the design, maintenance and operation of equipment; successful in handling men; experienced in effecting operating economies. PW-910, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

CAR builder, 14 years' experience as foreman in car construction and repairing. Can handle men and install efficiency methods for obtaining maximum production at minimum cost. PW-908, Elec. Ry. Journal, Old Colony Bldg., Chicago.

ENGINEER, executive, electric railway and public service, construction, operation, maintenance; available immediately. Carl H. Fuller, 305 Elm Street, Youngstown, Ohio.

FOREMAN—14 years' experience in car construction and repairing. Can handle men and cut your upkeep cost. PW-914, Elec. Ry. Journal, Old Colony Bldg., Chicago.

MANAGER now employed desires to make a change. More than 20 years of actual railway experience in all branches, including 15 years in the claim department as chief executive. Is alive, willing to work, capable of handling big propositions. Would accept position in either claim or transportation department. Best of references furnished. PW-912, Elec. Railway Journ.

SALES engineer with broad acquaintance in electric railway and mining field and formerly superintendent of equipment of large road desires to make permanent connection with a firm requiring the services of a man who can produce results. Will accept any territory. PW-915, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SITUATION wanted as manager of railway or gas properties, preferably in the South. Have managed one of the largest combined street railway, gas and electric properties in the South for the past three years. Can furnish best references. PW-900, Elec., Ry. Journal, Real Estate Trust Bldg., Philadelphia.

SUPERINTENDENT, 17 years' experience in all phases of transportation, traffic and equipment in northern Ohio; very satisfactory relations with present employers; personal reasons for considering change of location; age 37, married; excellent references as to character and ability. PW-901, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

SUPERINTENDENT of transportation with nearly 18 years' experience on large city, suburban and interurban properties desires making a change in near future; successful in dealing with public and employees. I would prefer a property that requires hard work, effort and ability to bring about results. Best of references as to character and ability. PW-904, Elec. Ry. Journal, Old Colony Bldg., Chicago.

VALUATION engineer, graduate E. E., University of Illinois. Completing valuation work for large public utility—street railway, gas, electric, water, ice and steam heat properties. Four and one-half years' experience, maintenance, construction, valuation in U. S. A. and abroad. PW-895, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SUPERINTENDENT: present employed Middle West; will consider city or interurban property located in Eastern state. Married; age 35; technical training. Clean, progressive with proven ability to successfully deal with labor and public. 14 years' experience. Best of references. PW-911, Elec. Railway Journ., Old Colony Bldg., Chicago.

WANTED

TWO CONTROLLERS

Used, but serviceable. Type K-34 preferred. Will buy or trade Four K-11 Controllers for them.

TIDE WATER POWER CO.
Wilmington, N. C.

WE WANT

6—L-4

CONTROLLERS

16—GE-87B

MOTORS

Transit Equipment Co.
501 Fifth Avenue, New York

FOR SALE

Generating Unit

1—480-hp., 100-r.p.m., 150-lb. pressure Bates Corliss Engine direct connected to 325-kw. D.C. generator, 550-volt Westinghouse, 100-r.p.m. with panel.

Central Illinois Public Service Co.
D. R. Truax, Purchasing & Stores Agent
MATTOON, ILLINOIS

FOR SALE

8 ONE-MAN STREET CARS

These are single truck cars—31 feet long—complete with motors for 650 V. operation. Hand brakes and manually operated doors. Have just been released from service in a city of 38,000 population.

A BARGAIN

Waterloo, Cedar Falls & Northern Railway
Waterloo, Iowa.

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

.Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE—One second-hand

BUCKEYE ENGINE AND GENERATOR

in good condition, description as follows:

DYNAMO—300 kw.; Mfg. Special 18527; Fields 16; Full Load; Mfg. No. 44813 Armature; Speed 143; Volts 550; Amperes 545; 8 Poles; Winding—Compound; Commutator—Good condition; Brushes—carbon; Type Armature Winding—Form.

ENGINE—Mfg., Buckeye; Horiz. Engine; Mfg. No. 5306½; Generator on right; crank on left; Tandem; Diam. Cyl—12 H 20-L; Stroke 32 in.; Cyl.—not rebored; Shaft Diam.—(in wheel) 14 in.; (in armature) 14; Length—31 ft.; Wheel Diam.—11 ft.; Face 20; Sections 2; Exhaust 12 in.; Floor Space—16½ x 31 ft. 3 in.; Diam. Steam 6 in.; Weight—not known.

The Beaver Valley Traction Co.
New Brighton, Pa.

FOR SALE

TRANSFORMERS

1—Type H, Form RP, Cycles 60, 200 KVA., 19100/33000Y—2300 Oil Cooled, Step Up Transformer.

1—220 Volt (B) KW., 60 Cycle, Oil Cooled, Step Up Transformer. 19100/33000Y —2300.

4—Type HS, Form RT, Cycles 60, 135 KVA., 17100/19100/33000Y—370/370/185, Oil Cooled Step Down Transformers.

All filled with oil and in excellent shape.

UNION TRACTION CO.
Nashville, Tennessee

IN STOCK

for Immediate Shipment

Turbo Units, Rotary Converters, Transformers, Motor Generator Sets, Dynamos and Motors

ARCHER & BALDWIN, Inc.
114-118 Liberty St., New York City
Telephone 4337-8 Rector

20% NEW REPAIR PARTS 20%

G-E—67—58—57—52—1000

20% OFF CURRENT PRICES

G-E 1200-800, W-12A—SRG, WP30-50

20% OVER JUNK VALUE

Rewound Armatures and Fields for Above Motors
K, K-2, K-10, K-11, K-12, K14, K6, Controllers and Repair Parts

Send Us Your Inquiries

20%

EASTERN MASSACHUSETTS ST. RY. CO.
1 Beacon Street, Boston, Mass.

20%

You can get

A Production Checker

at little cost

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

Bargain price for quick sale.

W. A. Hefner, care of McGraw-Hill Co.,
10th Ave. at 36th St., New York City

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

—

Are *you* using the Searchlight Section?

0200

Notice to Advertisers!

Owing to the holiday, July 4th, the "Searchlight" pages of the July 2d issue will close for press a day earlier than usual. Copy for this issue should therefore reach us by

10 A.M., Tuesday June 28th

SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SALES

2004

FOR SALE

15 International Fare Boxes

for registering dimes and nickels with separate locked compartment for pennies. Machines in perfect condition.

Fairmount Park Transit Co.
Station W., West Park, Philadelphia, Pa.

FOR SALE

Two Interurban Cars

in fine condition, one user very little as parlor car, two months in the year: Can put cross seats in this car. Cars have parlor, smoking and baggage compartment with toilet, hot water heat, GE-204 Motors, American Locomotive Trucks.

SOUTHERN NEW YORK POWER & RAILWAY CORPORATION
Hartwick, N. Y.

FOR SALE

500 tons 7 in. High 80 lb.

GIRDER RAILS

with Channel Plates—equal to new.
30 and 60 ft. lengths—will make low price.

Karasik, Friedman & Company, Inc.
Woolworth Bldg., New York

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Circuit Breakers
Condit Electrical Mfg. Co.

Air Receivers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
Cambria Steel Co.
Carnegie Steel Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
National Carbon Co., Inc.
Nichols-Lintern Co.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Oilless, Graphite, Bronze and Wood
Bound Brook Oil-less Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Brass & Bronze Products
American Copper Products Corp.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan
American Rattan & Reed Mfg. Co.
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Graphite
National Carbon Co., Inc.

Bunkers, Coal
American Bridge Co.

Bus Bars
American Copper Products Corp.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Bushings, Graphite and Wooden
Bound Brook Oil-less Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car
Pantasote Co.

Change Carriers
Galef, J. L.

Circuit Breakers
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

Conveying and Hoisting Machinery
American Bridge Co.
Columbia M. W. & M. I. Co.

Copper Products
American Copper Products Corp.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Traction Brake Co.

Cranes
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

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Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

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Allis-Chalmers Mfg. Co.

Culverts
Canton Culvert & Silo Co.

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Electric Service Supplies Co.
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St. Louis Car Co.

Cutouts
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Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Engineering Co.
Transit Equipt. Co.

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Electric Service Supplies Co.

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Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

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Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

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Arnold Co., The
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Feustel, Robert M.
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Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Horton, Barker & Wheeler
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Stone & Webster
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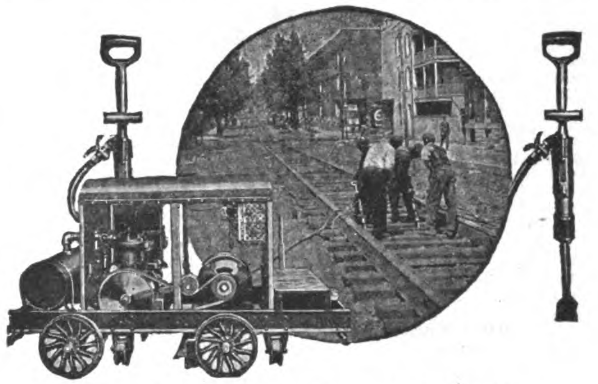

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No 5

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Frogs, Track (See Track Work)

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Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

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Electric Service Suplies Co.
National Tube Co.
Nuttall Co., R. D.

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Electric Service Supplies Co.
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Electric Service Supplies Co.
International Register Co., The
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Ohio Brass Co.
St. Louis Car Co.

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Brill Co., The J. G.

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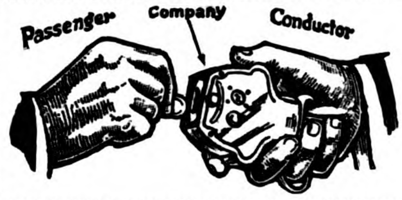

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St. Louis Car Co.

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Electric Equipment Co.
Foster Co., H. M.
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Karasik, Friedman & Co., Inc.
Reading Eng. Co.
Transit Equipt. Co.
Zelnicker, Walter A., Supply Co., Inc.

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Brill Co., The J. G.

Shovels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.

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Consolidated Car Heating Co.
Electric Service Suplies Co.
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Nichols-Lintern Co.

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Electric Service Supplies Co.
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U. S. Electric Signal Co.
Wood Co., Chas. N.

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Nachod Signal Co., Inc.
U. S. Electric Signal Co.

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Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

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Westinghouse Elec. & Mfg. Co.

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American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

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Brill Co., The J. G.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Abrasive Metals Co.
American Mason Safety Tread Co.

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

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Subway Switches
Condit Electrical Mfg. Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches. Track (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.
Johns-Manville. Inc.

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Condit Electrical Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville. Inc.
Westinghouse Elec. & Mfg. Co.

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Ingersoll-Rand Co.

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Standard Underground Cable Co.

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Globe Ticket Co.

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Cambria Steel Co.

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Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Poles, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Williams & Co., J. H.

Tools, Track and Miscellaneous
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

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American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
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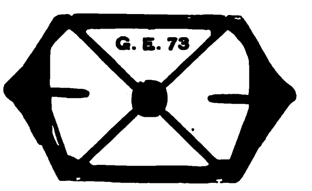

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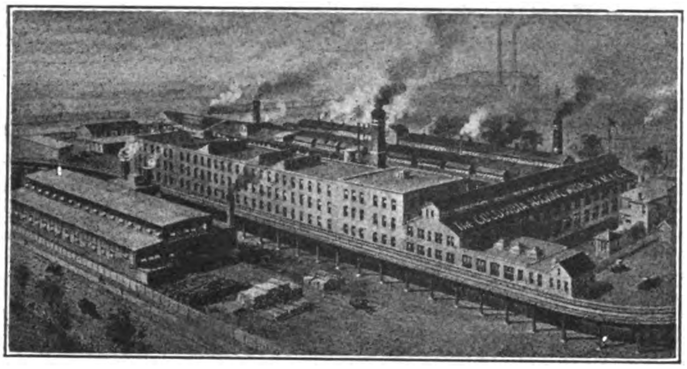

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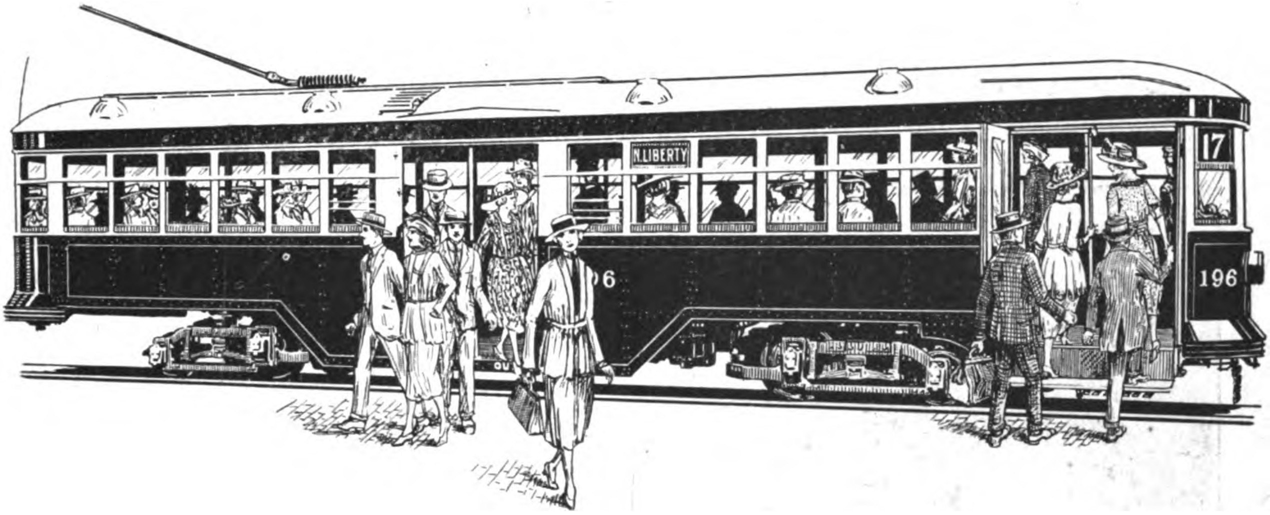

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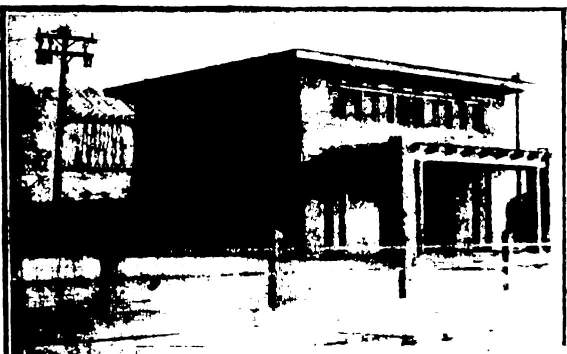

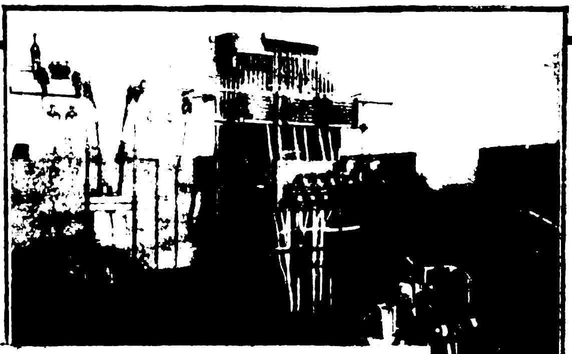

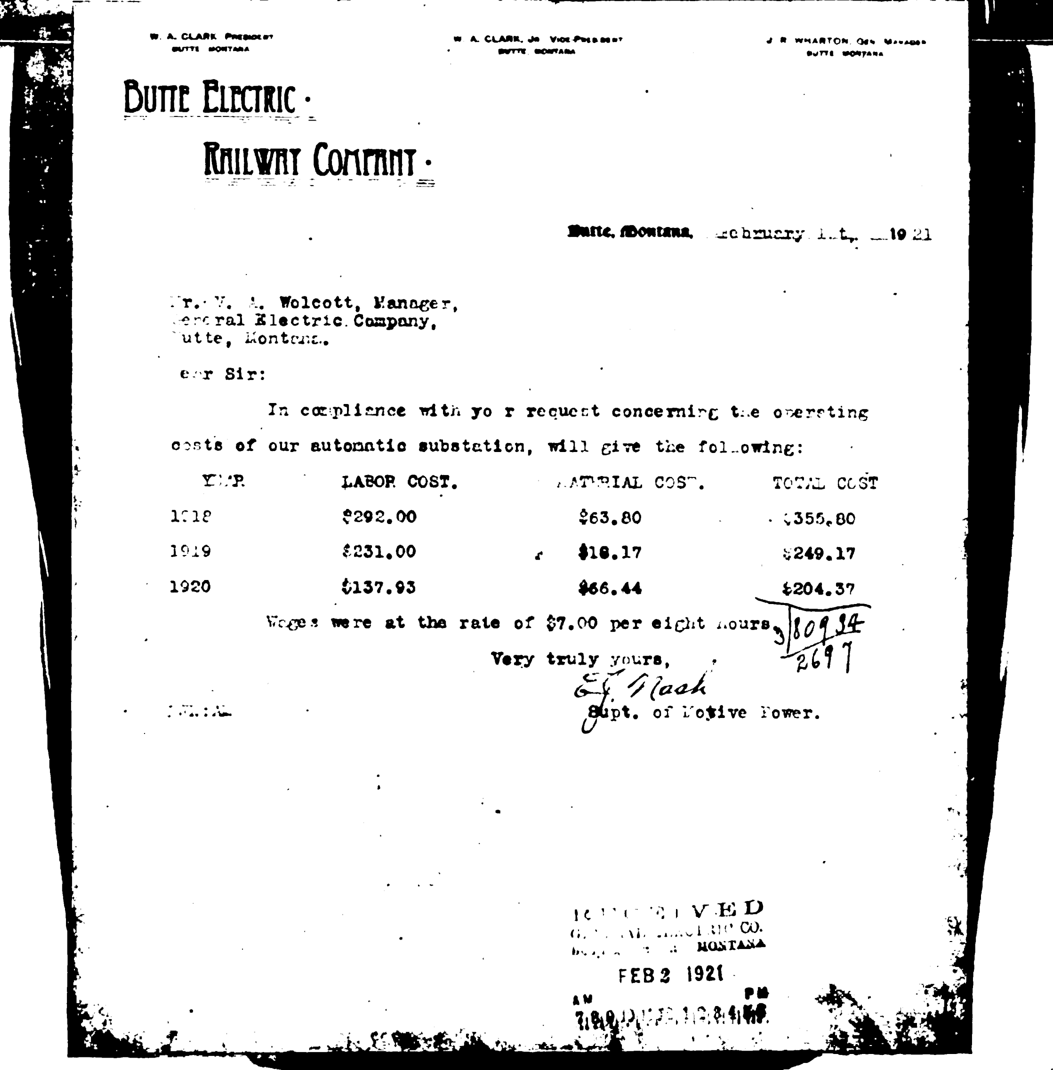

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